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MURCHÉ'S  
DOMESTIC  
SCIENCE READERS

BOOK VI





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# DOMESTIC SCIENCE READERS

BY

VINCENT T. MURCHÉ

AUTHOR OF 'OBJECT LESSONS IN ELEMENTARY SCIENCE,' 'OBJECT  
LESSONS FOR INFANTS,' 'SCIENCE READERS'

WITH PREFACE BY

Mrs. E. M. BURGWIN

INSTRUCTRESS UNDER THE LONDON SCHOOL BOARD  
MEMBER OF THE N.U.T. EXECUTIVE

## BOOK VI

MACMILLAN AND CO., LIMITED  
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1897



# DOMESTIC SCIENCE READERS

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ADAPTED TO MEET THE REQUIREMENTS OF  
THE EDUCATION DEPARTMENT

IN THE

CLASS SUBJECT OF DOMESTIC ECONOMY

AS LAID DOWN IN

THE CODE FOR 1896

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- BOOK I. { STANDARDS I. AND II.—CODE 1896.  
BOOK II. { Thirty object lessons on materials used for food—*e.g.* Flour,  
Meat, Vegetables, Tea, Coffee, Milk, Fruits, Salt.
- BOOK III. { STANDARD III.—CODE 1896.  
Chief materials used in clothing and washing—*e.g.* Silk,  
Linen, Wool, Cotton, Fur, Leather, Washing materials.
- BOOK IV. { STANDARD IV.—CODE 1896.  
Food : its composition. Clothing and Washing.  
Note.—The Chemistry of Food should not form part of a  
scheme for Standard IV.
- BOOK V. { STANDARD V.—CODE 1896.  
Food and beverages : their properties and nutritive value  
and functions. The skin and personal cleanliness.  
Note.—The Chemistry of Food is dealt with in this book.
- BOOK VI. { STANDARD VI.—CODE 1896.  
Food : its preparation and culinary treatment generally.  
The Dwelling : Warming, Ventilation, Cleaning.
- BOOK VII. { STANDARD VII.  
Food : simple dishes. Rules for health. Common ailments,  
and their remedies. Management of a sick-room.

## PREFACE

THE girls of to-day are to be the wives and mothers of the future. The author has had this ever before him during the preparation of these School Reading Books for Girls, in which the chief aim has been throughout to lead the young readers to recognise the nobleness of woman's work in her home.

Surely, if the school is to be a real training-ground to equip the child for its future life, no subject in the curriculum, however useful or ornamental, demands a more prominent place than that which helps to fit a girl for those duties and responsibilities which sooner or later must fall to her lot.

Then, too, the extraordinary dearth of good domestic servants is the almost universal lament to-day in middle-class homes. Why should there be this dearth? Is it because young girls, for want of proper, suitable training, have grown to look upon all household work as a sort of drudgery to be avoided if possible?

The author begs to take this opportunity of expressing his deep sense of gratitude to that excellent institution known as the Ladies' Sanitary Association, of 22 Berner Street, W., and to its obliging and genial Secretary, Miss Rose Adams, to whom he is indebted for some very valuable hints and useful advice.

One of their admirable little pamphlets truly says: "*Acts of Parliament* may enforce sanitary regulations; '*The Health of Towns Act*' may ensure good drainage



and water-supply, pure air, and other important external sanitary requisites; but till every woman frames a 'Health of Homes Act,' and becomes a domestic 'officer of health,' none can ensure that the pure air shall ever be breathed, the good water ever be sufficiently used, or other sanitary conditions ever be fulfilled indoors.

"The Government may, by appointing public analysts and inspectors of markets, check adulteration and the sale of diseased meat; but only woman can ensure that wise selection of diet, and that scientific cookery, without which even plenty may lead to disease.

"Architects may build houses which in point of structure shall be very temples of Hygeia; but while woman who dwells there ignorantly violates household sanitary law, she will ever make them nurseries of disease and death."

A great deal has been written in the public press and elsewhere on the subject of accidents by fire; and the School Board for London recently issued a circular to their lady teachers, urging them to give periodical instruction in this all-important matter to the girls under their charge.

In dealing with the subject of Warming and Lighting, the author has found a place for some practical lessons on the dangers of fire and how to avoid them; and he takes this opportunity of expressing his indebtedness to a small tract by Professor John Marshall, F.R.S., entitled, "*What to do when the dress catches fire.*" This tract has supplied useful and **valuable** advice, which has been woven up into suitable *us for this book.*

## PREFACE BY MRS. BURGWIN

THIS Sixth Reader is written in the same interesting and intelligent style which has characterised each of its predecessors. Facts regarding a home, which in days gone by were learnt through bitter experience by our grandmothers, are here set forth in language which can be grasped by children of average intelligence of eleven or twelve years of age, and one wonders what they will have to learn when they reach the age of maturity.

Certainly, if each lesson on the "house" is learnt, the days of the "Jerry builder" are past and gone for ever, and the "Temple of Hygeia" becomes the abode of our future citizens. In this lies our individual safety, when we reflect how close to each other we must live in this over-populated city.

The chapters on food aim at teaching the principles by which it should be cooked, and the dishes of the working-man's home have, as they should, a prominent place.

A Course of Reading such as this Series gives, should prevent much of the sickness and waste which, through ignorance of sound principles, destroy the happiness of many homes.

E. M. BURGWIN.



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## BOOK VI

### PART I.—THE DWELLING : WARMING, VENTILATION, CLEANING

#### **AN INSANITARY HOUSE**

NORAH very ill; Bob very ill—nay, every one in the house ailing. What could it mean? It was such a pity, too, for they had all looked forward to their new house with so much pleasure and expectation long before they came to it; and during the three months they had been living there, how proud they had been of it, too. For really it was a very prettily built house, with large bay windows, which made the rooms nice and light, and a stained glass door, with a brass knocker, and I don't know what else to make it look bright and smart.

Then above all things it had a bath-room, fitted with taps for hot and cold water. What an attraction there was for them in that, for they had never had the luxury of a real bath-room before. Moreover, there was the added charm of its being a brand new house, so that all the decorations and fittings were fresh and *new and bright*.

*It was a happy day for Norah when she went out*



with her father and mother on their house-hunting expedition, and after almost endless searching, they at last lighted on this pretty place, which they said would just suit them.

The fact is, her father had lately been so fortunate as to secure a new appointment, which would give him a much better income, and he felt they could now afford to live in a larger and better house than the one they had previously occupied. They selected this part of the town, because it would be more convenient for him to get to his business; but it was altogether a new neighbourhood to them.

Here, then, they had been located for the last three months, but strange to say they had never seemed to be quite well—the place certainly did not suit them like the old house they had left; and now things were so bad at last that the doctor had to be called in.

“Good morning, Mrs. Hunter,” said the doctor in a cheery voice, as he entered the parlour. “I have had a very bad account of you all from Mr. Hunter this morning. He asked me to pay you a visit. Now what is the matter? Nothing serious, I hope.”

Mrs. Hunter told him how they had all fallen off most unmistakably in health since they had been in their new house. She was first led to think there must be something wrong by seeing the children gradually lose their appetite. She had noticed for some time that they were never ready and eager for their meals as they always had been, and that they did not seem to enjoy their food. They had frequently *complained, too, of headache, a thing which had been unknown before, and she was often pained to see them with such pale cheeks, for they had always been so*

rosy and ruddy. This morning, when she found both of them with sore throats and very hot and feverish, she began to be really frightened, and she begged her husband to call in the doctor without any more delay.

This was the substance of what she had to say about the children, and then she added, in the true mother's spirit of self-forgetfulness, always putting herself last, "I feel very ill myself to-day, doctor. I don't know what it can be, but my head and throat are both bad."

"Well, let us go and see the little people first," he replied; "but if I am not mistaken, mother wants the doctor as much as they do," and he followed her upstairs.

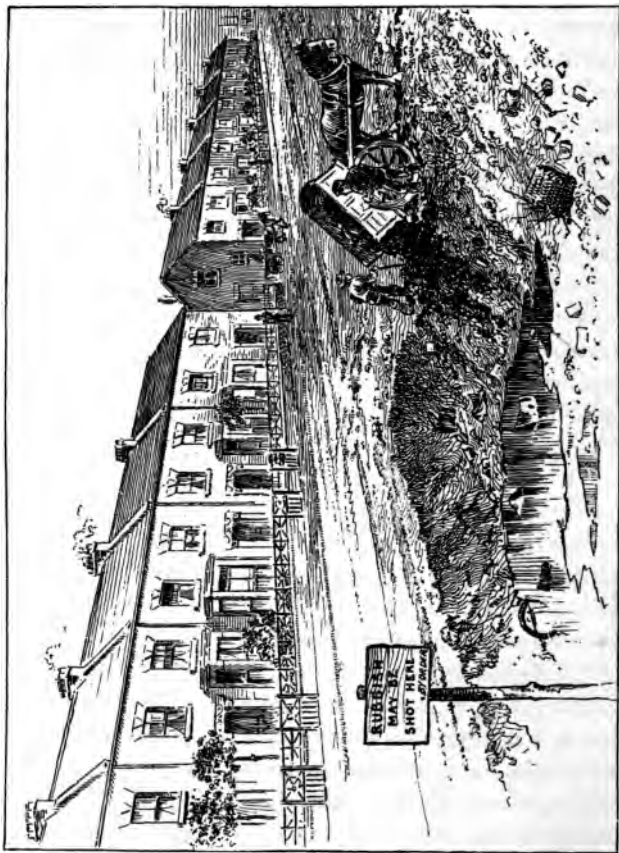
His examination of the two children did not take very long, but when he turned to leave the sick-room there was a dark angry look in his honest eyes, and by the time he had returned to the parlour, the full blaze of his righteous indignation blazed forth.

"It's scandalous," he said, "it's nothing better than a crime, and ought to be treated as a crime. What is the use of Acts of Parliament for 'The Better Housing of the Poor' if unprincipled people, for the sake of putting money in their pockets, are still allowed to build houses which can be nothing but fever dens?"

"My good woman," he added, "I have known this spot for years. It was at one time a brickfield, and since it has been no longer wanted for that purpose the authorities have allowed it to be used as a shoot for rubbish of all sorts. The original hollow from which the brick-clay was taken has been filled up in fact with this rubbish from time to time to make it level with the rest of the ground.

*"This so-called rubbish always contains, in addition to the ashes, road-sweepings, and such like, more or*

less animal and vegetable matter in a state of decomposition. As these things rot and decay they give off foul



*gases which are in the highest degree injurious to health.*

*"This, unhappily, is the kind of ground on which your otherwise pretty house is built," he added, "and*

now let me show you where the mischief comes in. Every fire you have in the house warms the ground, and helps these organic matters to decay more rapidly, and as they decay the poison gases from them make their way upwards, through the soil, through the boards of the flooring, and through every crack and cranny in the house, till the whole place is reeking with them."

"That, then, accounts for the close fusty smell I have always noticed, before the house has been opened in the morning," said Mrs. Hunter.

"Of course it does," replied the doctor. "The fact is, you and your children have been slowly poisoned during the last three months. That is the cause of your illness—nothing else. Your husband gets less of these poison gases than you and the children do, because he is away all day, and of course it does not affect him so seriously.

"I am sorry to say yours is not the only case, for I am now attending several families all round you, who are being poisoned in a similar way. And that reminds me," he added, "that I should like to see the drainage arrangements of the house while I am here."

Away he went on his tour of inspection, but he was soon back again, looking more angry than before.

"Worse and worse, my dear woman," he said. "No wonder, indeed, that you are all ill. This is an insanitary house in every sense of the word. They have given you a fine bath-room, but the outlet from the bath opens direct into the drain-pipe. Indeed, every drain and every sink in your house is in direct communication with the sewer, and as a natural consequence *your rooms are always filled with poison gases from it.*"

"What are we to do, doctor?" asked the poor

woman, now seriously alarmed for her dear children if not for herself.

"The first and only thing for you to do at present is to get away from this place with the children as soon as you can," replied the doctor. "I trust I shall be able to undo the mischief then; but all my work would be in vain if you remained here. It would be impossible for you or them to get well with these vicious odours all round you," and he took his departure.

*Summary.*—Avoid houses, however pretty and ornamental they may be, if they are built upon "made ground." The rubbish which has been shot there to fill up the hollows is sure to contain decaying organic matter, which becomes a source of fever. It is a death-trap.

### A FAMILY COUNCIL

Mr. Hunter had left home that morning in a very anxious state of mind as regards the children. Indeed he could scarcely contain himself at his work all day, and he determined that he would call upon the doctor on his homeward journey in the evening, and hear what he had to say. The doctor told him the plain facts of the case, but reassured him by adding that the mischief might all be averted if they would get out of the house at once. He even recommended a little house in a healthy part of the town, which he thought would suit them for a time.

The result of all this was that in a couple of days they had said good-bye to the pretty ornamental death-trap, as the doctor called it, and were located for the time being at least in another home.

**H**ere, mother's careful nursing combined with the father's skill soon did wonders for Norah and Bob.

and even mother herself, in spite of her anxiety, began to regain her usual health and spirits.

Then just before the doctor paid his final visit, a letter arrived from Aunt Jane, saying how glad she was to learn that the children were better, and that she would like to give them a chance of regaining their lost roses, if mother could spare them for a few weeks to stay with her at the farm.

The letter ended by saying that Uncle Sam was coming to town during the week, and would take Norah and Bob back with him. Needless to say, they went, and father and mother were left alone. That same evening they held a sort of family council.

"It is quite time now, my dear, for us to arrive at some conclusion as to what we are to do," said Mr. Hunter, "for I can clearly see we cannot continue to live here. The place, although wholesome, is inconvenient in many respects. But the question is, where shall we live?"

"When I think that we shall have to go through all that weary task of house-hunting once more, John," she replied, "with the chance, after all, of getting into another of those insanitary houses, or death-traps, to use the doctor's expression, I feel I would rather put up with the inconveniences, and stay where we are."

"Have no fear on one point," he rejoined. "We will steer clear of the death-traps for the future. We have learnt our lesson well so far as that is concerned.

"You see," he added, after a few moments' pause, "the first thing for us to remember is that, like all other people who have to work for their living, we cannot live *exactly where we choose*. I need not remind *you that it would be as impossible for the farm*

labourer to live in a big town like ours, as it would for the miner or the mill-hand to live with him in the country. No, we must all live, whether we like it or not, where our employment lies, or as near to it as possible—the miner within easy distance of the mines, the operative in the town where the mills and factories are situated, and the farm labourer near the farm. So, too, with me ; I must live near my work.”

“That has been the great trouble to me, John, ever since we came to live here,” she replied. “You now have to leave home much earlier in the morning, and then there is that long tiring journey again at night, so that your day is lengthened at both ends.”

“That sort of thing is all very well in London and other immense towns,” said he, “because it cannot be avoided. In those busy crowded centres, where every bit of ground is wanted for workshops, factories, docks, wharfs, warehouses, and offices of all kinds, there is very little room for dwelling-houses, and people are compelled to live in the outskirts. But then there are plenty of railway and tram-car facilities, with cheap, special fares for the work-people.

“What a sight it is in London,” he added, “to see train after train, tram-car after tram-car, bringing in the workers in the morning, from all points of the compass to the busy hive in the centre, and taking them back, in the evening, to their homes in the outskirts of the mighty city. But after all it must not be forgotten that this means money as well as time and inconvenience to these people, for they have *to pay away part of their wages, however small, every day in train or tramway fares.* Thousands of them, *especially those with slender incomes, would doubt-*

less prefer, if it were possible, to live nearer their work."

"Well, this is not our case, John," replied his wife, "for there is no reason why we should not be able to find a suitable house within reasonable distance of your work. We are not likely, I feel sure, to repeat the evil from which we have already suffered; but there is one most important point, which, for the sake of the dear children, we must not forget. I would much rather pay more in the shape of rent to live in a respectable neighbourhood, even if we must deny ourselves in other ways to do it, than have my children brought up amid low, evil surroundings."

Mr. Hunter sat very thoughtful for some time, and then he said, "Why should we pay rent at all, dear?"

"What do you mean, John?" she replied. "We must pay rent wherever we live."

"I am not so sure of that," he said again. "Why not have a house built for ourselves? We could then choose our own situation, and have the house made to suit us exactly."

"Oh, John, that would be delightful," she cried. "But how can you do it?"

"Do you forget my Building Society Book, dear?" he asked, and his eyes twinkled with pride, for a new idea had struck him. He had been a saving man for many years, and the result of his savings now was a very respectable sum to his credit in the Society.

"The very thing, John," she replied. "I wonder why we did not think of this before."

"Ah, dear, I have had it in my mind for some time," he said, "but I would not mention it to you till I had ascertained for a fact that it could be done."



Now, as you are pleased with the idea, I will at once set to work with the necessary arrangements, and we will have a house of our own."

It was all settled accordingly within the next few days, and Mr. Frost, a respectable and honest builder in the town, and an old friend of the family, undertook the work of building the house.

*Summary.*—Many things have to be taken into consideration in the choice of a house. In large towns house-rent is a heavy item; but speaking generally, it should not exceed one-eighth of the income. Still in some cases it is advisable to pay a little more in rent, so as to secure health and respectable surroundings, even if it necessitates a sacrifice in some other quarter.

## SELECTING THE SITE

A day or two later the Hunters had a visitor. It was Mr. Frost the builder, who came to tell them that he had seen a very eligible plot of land, which he thought would just suit them, as the site for their new house—position, aspect, subsoil all that could be desired.

"Where is it situated?" asked Mr. Hunter.

"It lies on that rising ground just behind Union Street at the other end of the town," said Mr. Frost.

"Oh, I know it," said Mrs. Hunter. "It is scarcely ten minutes' walk from the warehouse, John. I should be able to come home to your meals without any undue hurrying. How much nicer that would be than getting a hurried meal away from home."

"There is another very important side of the matter to consider," said Mr. Frost. "The whole neighbourhood is a very respectable one. You need have no fear that your children would be contaminated by evil influences and low surroundings. But sup-

we go and look at it," he added; "and perhaps Mrs. Hunter will go with us. She ought certainly to have a voice in the selection."

Accordingly they set out together, chatting pleasantly on the way, till they arrived at the spot, and Mr. Frost pointed out the piece of land in question.

Mrs. Hunter was at once taken with its pleasant situation and aspect on the slope of the hill. "What a pretty little garden we could have all round the house, John," she said. "We should get plenty of sunshine and brightness here, and somehow I cannot live without sunshine. It seems to cheer the mind, and invigorate the body too.

"I often pity those poor people who are compelled by circumstances to live in the close narrow courts and alleys of our great towns, where the sun cannot penetrate. Their pinched, blanched faces tell only too plainly how much they miss this chief of nature's invigorators. I am almost an Italian in my love for the sun; and there is an old Italian proverb which says, 'If you keep the sun out of your dwelling, you will quickly have to admit the doctor.'

"I am sure," she added, "a spot like this must be a very healthy as well as a very pleasant one."

"There is not much doubt about that," replied the builder. "Indeed there is a double reason why it should be healthy. As it stands high, it is always exposed to the purifying influence of the wind; while the air in a low-lying spot becomes stagnant and impure. Then, too, it is sure to be dry, because the moisture in the soil will naturally sink down, if it can, into the ground at the foot of the hill."

"Why did you say if it can?" asked Mrs. Hunter.

"Well, you see, it always depends on the nature of the subsoil, as to whether this moisture passes away or not," replied the builder.

"The subsoil, I suppose, is that which lies immediately below the surface-soil," said Mrs. Hunter.

"Yes, that is what I mean," replied the builder. "If this subsoil, then, consists of clay, the water must remain where it is; it cannot drain away, because clay is impervious, and will not allow water to pass through it. But there is no fear of clay on this hill-side," he added. "Your subsoil here consists, for the most part, of gravel, and the spot will be dry from the very nature of the soil—the water in fact could not stand in it. Chalk and sandstone, like gravel, are pervious soils too, and always ensure a dry healthy site for a house. I need not tell you that the health of the household depends, to a large extent, on the dryness of the situation, and its freedom from damp."

"Then you mean to say that all houses in a low-lying spot are sure to be damp, especially if they are built on a clay subsoil," said Mrs. Hunter.

"Not exactly that, my dear madam," replied Mr. Frost, "for there, again, it depends entirely upon circumstances. We cannot all live on the hilly slopes of course—indeed, more people, by far, live in the valleys than on the hills—and it would therefore be a terrible calamity if every house built in a valley were irretrievably damp and unhealthy.

"No, in the first place, if the subsoil is a pervious one, it dries itself almost as readily as that on the hill-side *does*, by letting the water sink through it and pass away, and no dampness remains to find its way upwards to the house. Even if the subsoil consists of

clay (and this is often the case), much may be done by careful draining, to carry off the water, which would otherwise settle there and make the house damp.

"It is where these necessary precautions have been neglected, in building a house on a spot with a natural tendency to dampness, that the worst evils are seen. The inmates of such a house are always liable to colds and agues, and these in time frequently develop into rheumatism, and that terrible scourge—consumption. Under any circumstances, a damp house on a damp situation should always be avoided.

"I need scarcely remind you," added Mr. Frost, "that here you have a natural soil, not one made up on a rubbish shoot, containing all sorts of foul, rotting, organic matter. You need not fear any repetition of your past troubles, if you settle on this spot."

"I think," replied Mr. Hunter, "the place will suit me admirably; and if we can arrange with the owner as to the price, we may as well consider the matter settled, and you are at liberty to commence your operations as soon as you please, Mr. Frost."

Accordingly, the next day the purchase was duly made, and the spot on the side of the hill became the site of Norah's future home.

*Summary.*—Much depends upon the nature of the subsoil. Gravel, sandstone, and chalk are pervious soils. All moisture drains away through them leaving the house dry. Clay is impervious—water cannot pass through it. Houses built upon clay are always damp, and give rise to colds, agues, rheumatism, and other diseases.

## LAYING THE PLANS

*The next day Mr. Hunter sent a note to his friend the builder, inviting him to call in during the evening.*

and discuss the style of house which would be most suitable for the situation. This, of course, was very necessary, in order that Mr. Frost might at once set to work with the preparation of his plans.

When, therefore, the appointed time came, and with it Mr. Frost, the two friends sat down to deal with the business that had brought them together.

"The first point to consider," said Mr. Frost, "is the aspect of your house. You have chosen a good dry site, so that you need not fear any dampness rising from the soil. Our next point will be to arrange for the sun to do his share in keeping the house dry. We can only do that by placing it in a good aspect, for unfortunately we are not blessed with any too much sun in this country, and it therefore behoves us to make the most of what we do get.

"Perhaps a greater misfortune still is that our lack of sunshine is made up in cold, bleak, treacherous winds from the north and east, especially in the winter and early spring. We must place our house in such a position as to offer every facility to our friend the sun to look in upon us, while at the same time we put it out of the power of those treacherous enemies to do us any harm.

"Most of your windows will, of course, be in the front of the house. We must therefore arrange to place our frontage in a sunny aspect, that is, the frontage must look towards the sun. This will serve a double purpose, for the sun will readily enter the house in the front, while the back, in which there will be fewer windows, will afford a better protection against *the bleak cold winds*. The best aspect we can have *is a south-west one*, and as we have only ourselves to *please, I think* we will fix upon that."

"We are certainly very lucky in being able to choose for ourselves in this way," said Mr. Hunter. "It is not every one who can do so. I have often been struck with the difference in the appearance of the houses in different streets of the same neighbourhood. Those in one street have a bright, cheerful look, and you say in a moment, 'What pleasant houses these are.' You turn a corner, and although the houses are precisely the same in build, they look dull and gloomy, and all for the want of sun.

"I always made up my mind that if ever I had to look about for a house, I would never choose one on the sunless side of the road. I like to see the sun streaming in at the windows."

Mrs. Hunter came in at that moment, and, hearing the last remark of her husband, she said, "If you are discussing windows, I should certainly like to join you, for I do hope you will give me large windows, and as many of them as you can. I believe there is nothing so essential to health as plenty of light.

"Sunshine in the home is sunshine in the heart, and I am sure the healthiest and happiest people are those who get plenty of sun. It cheers and brightens their lives while they are in health; it does more than anything else to restore their wonted tone and vigour, when they have been weakened by sickness.

"Think of what the blessed sunshine is now doing for my darlings after their dangerous illness," she added. "Aunt Jane says they are getting quite ruddy and strong again."

"Ah, mother, you and my dear children are the *sunshine of my home*," said Mr. Hunter.

"Yes, but shut us up in some darkened room away

from the sun, and you would soon find how little brightness would remain in us," she replied.

"There is one thing that everybody ought to bear in mind," she added. "Darkness and dirt may go hand in hand, but sunshine and dirt never. Let me have plenty of light in my home, and there will be no place there for dirt. Therefore I say give me large windows and plenty of them.

"Go into the dark gloomy slums, and there you will find disease and sickness of all sorts, because it is in those places that filth is allowed to accumulate unseen to poison the air with its impurities."

"Very well, then, we will consider the window question settled," said Mr. Frost. "Now for the house itself. Have you any wishes as regards the rooms?"

"We must have a bath-room, however small," said Mrs. Hunter. "Personal cleanliness is another most important factor in securing health, and with it happiness in our everyday life. So important is it, that I trust the day is not far distant when the bath will be considered as a necessary of life in every house.

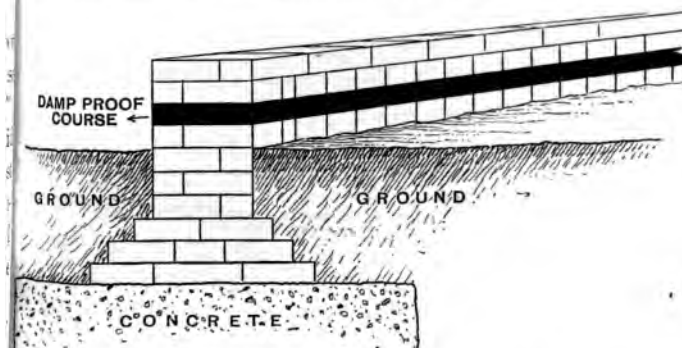
"Next to that you must give me a good kitchen," she added, "so that I may have a suitable place for the preparation and cooking of our food. The best of food is often spoiled by bad careless cooking. As regards the rest of the rooms, I know I can safely leave that to you. We are not a large family. I prefer a few large airy rooms to a number of small stuffy ones.

*Summary.*—Sunshine and brightness in the house are essential to health. The best aspect for a house is a south-west one, for the *frontage* of the house will look towards the sun during most of the day. Large windows admit plenty of light.

## BUILDING THE HOUSE

One day Mr. Hunter thought he would like to see how the new house was progressing, so, having half an hour to spare, he strolled round in that direction. He was surprised and pleased to find the work so far advanced, and he intimated as much to Mr. Frost, who came forward to meet him.

"Yes," he said in reply, "the weather is all in our favour, and we are getting along very satisfactorily.



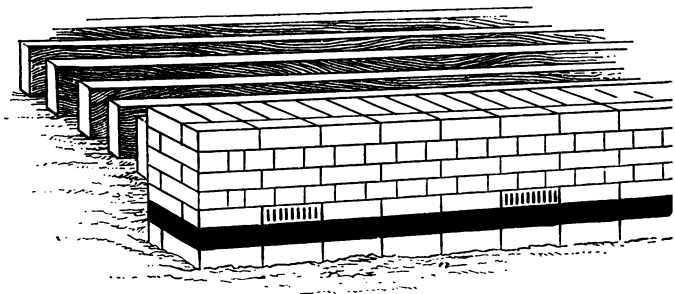
Come and look round; I will show you where we are.

"I thought I would give you a sound foundation to begin with," he added, "so I have laid a good solid bed of concrete, eighteen inches thick, for your house to rest upon, and the bed itself extends fully six inches beyond the line of brickwork all round. You need have no fear of your house slipping, or the walls cracking, with such a substantial foundation as that; and very little damp will find its way up, through that bed of concrete, from the soil to the porous bricks. No



house should ever be built without a good concrete foundation.

"Now for the brick-work," he added. "You see we have laid several courses, indeed we are already above the ground-level; and I want to show you another protection I have given you against damp. Follow with your eye that black line in the walls all round the house, just above the level of the ground. It consists of a layer of asphalte, and extends through the whole thickness of the walls. Asphalte is im-



pervious to water, and consequently whatever moisture may soak into the porous bricks below this layer cannot pass up through it to the brick-work above. In fact the damp-proof course effectually cuts off from the walls of the house all damp which proceeds from the soil either beneath the house or round it.

"Some builders," he continued, "use slate for this purpose, some prefer sheet-lead, and others again hard blue Staffordshire brick. These all accomplish the same object, but I invariably use asphalte."

"What do these iron gratings mean, that are built into the walls all round?" asked Mr. Hunter. "You

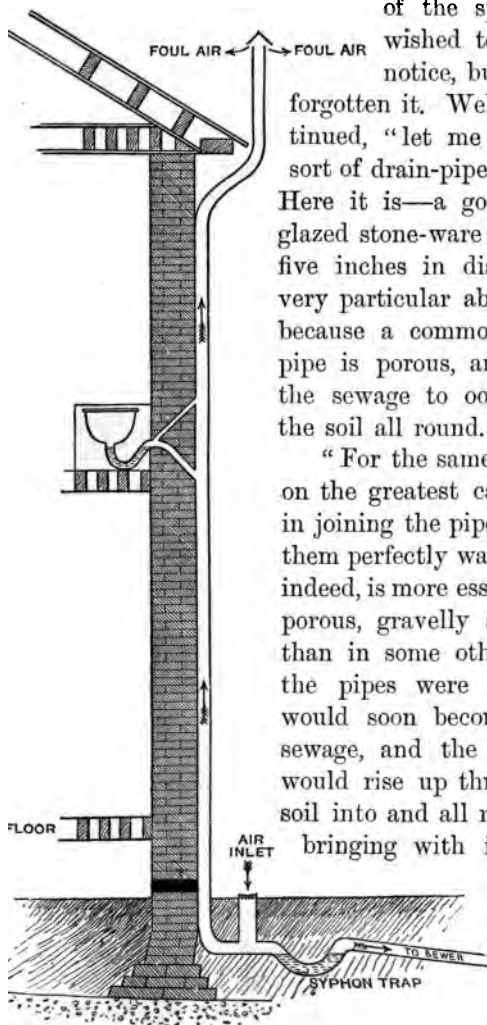
must remember," he added, "I am quite as much a novice at your trade as you would be at mine, so you will have to explain several things to me."

"Well, you see," replied Mr. Frost, smiling, "these gratings are all built into the walls between the flooring and the level of the ground. It is very necessary to provide for a constant current of air under the floors of the house, for this helps again to keep the house dry, by preventing the accumulation of moisture in those underground spaces. It is no uncommon thing to find the floors of a house so damp, that the carpets on them quickly rot away; and even the joists, on which the flooring rests, are often found in such a state of decay that they are mere touch-wood.

"We call this dry-rot," he added, "but never fear, there'll be no dry-rot in your house, for, with all these gratings, there will be as good a current of air underneath the floors as above them.

"Let me call your attention, now, to another point in your model house," he went on, "for remember, my friend, I mean it to be a model house. I want you to notice the thickness of the walls. None of your thin single-brick walls for me. I want a good solid wall that will keep out the weather, and I am certain a nine-inch wall cannot do that. A thin wall of that kind would be as cold as a well in winter, and as hot as a furnace in summer. There is nothing like a good fourteen inch wall, a brick and a half thick."

"Can you give me any idea of the arrangements you intend to make as to the drainage?" asked Mr. Hunter, "for, naturally, after our late experience of an *insanitary* house, we feel very anxious on this point."



"Why, of course," replied Mr. Frost; "that is of the special thin wished to bring to notice, but I had all forgotten it. Well now," he continued, "let me show you sort of drain-pipe I intend to Here it is—a good, sound, glazed stone-ware pipe, measuring five inches in diameter. I am very particular about these pipes because a common badly glazed pipe is porous, and would let the sewage to ooze through the soil all round.

"For the same reason, I insist on the greatest care being taken in joining the pipes, so as to make them perfectly water-tight. This, indeed, is more essential in a porous, gravelly soil like yours than in some other soils; for if the pipes were leaky, the sewage would soon become loaded with it, and the stench from it would rise up through the soil into and all round the house, bringing with it the germs of typhoid, scarlet fever, and other infectious diseases.

"I have

a plan of the drainage arrangements," he added. "Perhaps you would like to examine it. This, you see, is the soil-pipe, which connects the water-closet with the drain, and here is the drain itself leading away to the common sewer. You notice, of course, that I have given this pipe a good fall; it dips as much as three inches in the foot. That, I need scarcely tell you, is to assist the flow onward to the sewer.

"I want you to notice, too, that the soil-pipe runs down outside the house, and joins the drain under the ground, and that a pipe is led up from it above the roof of the house, to carry off the foul gases, which might otherwise accumulate and find their way back into the house. This we call the ventilating shaft.

"But I have the best part of the arrangement to show you yet," he went on. "You notice that the drain bends down in something of a U-shape, soon after the soil-pipe joins it. This U forms a trap for intercepting any foul gases that might otherwise make their way back from the sewer. We call it a syphon-trap; it is always full of water up to the water-line. The water itself absorbs the noxious gases, so that they do not pass back again into the soil pipe, and so into the house.

"Then, too, you see between the syphon-trap and the entrance of the soil-pipe a small open grating. This is to admit the air into that part of the drain, and so cause a current up the ventilating shaft. Don't you think my arrangements ought to give you a good sanitary house?"

*Summary.*—A concrete foundation, with a damp course just above the ground, and gratings in the walls to admit plenty of fresh air below the floors, will do much to insure the house against damp. All drains should be trapped to prevent the sewer-gas from rising into the house

## ANOTHER VISIT TO THE HOUSE

Mr. Hunter's business took him unexpectedly away from home for several weeks, and it will be readily understood that one of his chief anxieties all the time was to know how the house was progressing. Consequently, on the evening of his return he paid his friend Mr. Frost a visit to learn some particulars about it.

"Glad to see you back, my friend," said the builder in a cheery voice, as the two shook hands. "I suppose you are anxious to know how we are getting along over there on the hill. Well, as a matter of fact I have surprised myself with the progress we have made, but still I do not intend to tell you anything to-night. To-morrow will be quite soon enough, and then you will perhaps bring Mrs. Hunter with you. I think it will interest her as well as you."

This ended the matter so far as that night was concerned, for Mr. Frost could not be persuaded to give any description of the new house and its progress, and so, after chatting for some time, the two men shook hands, arranging to meet the next day.

The next day came, and, accordingly, at the appointed time, Mr. and Mrs. Hunter walked over to see their new house. "Look, John," she cried, as soon as they came within sight of the place, "that must be it, and yet I can scarcely believe my own eyes; the walls are all up, and the roof is nearly finished."

Mr. Frost, who had been looking out for them, now *came forward*, and raising his hat to the lady, said, "*You seem a little surprised to see your house; but you must not think it is finished yet, although we*"

are certainly getting along very well. Come round with me in this direction, so that you may see the front."

"Oh, what lovely bay windows," exclaimed Mrs. Hunter. "The very thing I have been wishing for, John. What nice, bright, cheerful rooms we shall have upstairs as well as down."

"I am glad you like the windows," said the builder, "although probably you have noticed only their size. Well, they are large windows; I remembered your wishes in this respect. But let me point out to you one or two things in connection with them which you most likely have not noticed.

"Bays, when badly built, frequently become a nuisance. If you look, you will see that the top part of our bay slopes downwards from the wall, so that all water will fall off clear of the wall itself; it cannot lodge or accumulate anywhere, or run down the wall. All our bays, too, are built of good solid stone, not, as is often the case, of soft ornamental bricks, which quickly become tell-tales of the weather.

"All projecting parts of a house in fact, such as these, may become, if badly constructed, the cause of dampness in the walls, for the rain which falls on them, instead of being carried off, is left to trickle down the walls themselves. I have only to remind you of the porous nature of bricks, and you will not be surprised that the walls quickly get soaked through with water under such circumstances.

"You will no doubt be surprised to learn that an ordinary brick will absorb, and hold within itself, a pint of water. Think, then, what an enormous quantity of water a badly constructed wall is capable of absorbing, and how damp such a house must be.

"Now look at our window-sills," he continued "with properly built bays and broad sills like the projecting well beyond the walls, there need be no fear of damp, for the rain which falls on them is always thrown clear of the walls."

"I see you have given us a good overhanging roof," said Mrs. Hunter. "Of course you have made the project so far, for the self-same purpose of preventing the water from trickling down the walls."

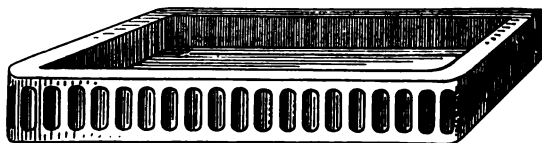
"Yes, madam, that is so," said Mr. Frost, "and I flatter myself, when we get the roof-gutters all round and rain-water pipes to carry off the rain that falls on them, you will be able, in your snug little nest here, to defy the elements."

"You see," he added, "we had already been through such pains, what with our concrete foundation, our damp-proof course in the walls, and our underground ventilation, to prevent damp rising from the soil, that it would have been very stupid to leave ourselves unprotected against the rain and snow that fall from above. Now you may reckon you are secure against all. But suppose we have a look inside."

They threaded their way as well as they could, walking on planks, through the lower part of the house, but of course there was no staircase yet, nor anything except the joists and rafters, to show where the upper rooms were to be. When they came to the scullery room which was to be the scullery, Mr. Frost said, "This just reminds me that we shall soon be thinking about fitting up the sink here, and I should like you to choose the kind of thing you will have."

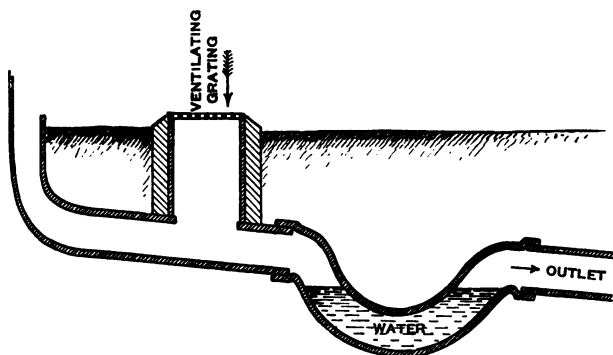
"Here," he said, "are several varieties of sinks, and he showed her an illustrated trade catalogue."

in my opinion, none of them are so clean and wholesome as the hard glazed earthenware sort. Those made of stone are porous and become corroded in time, and then they always smell very badly."



Mrs. Hunter said she thought it best to take their friend's advice, in this as in all else connected with the house, because he knew so much better about these things than either her husband or herself; and so it was settled that they should have an earthenware sink.

"Having settled that matter," continued Mr. Frost, as he pulled some papers from his breast-pocket, "I



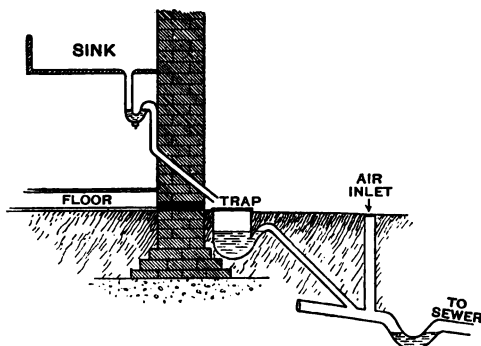
will next let you see how we propose to defy the ever-demon. This is a plan of the drainage arrangements of your house. I have already shown it to Mr. Hunter. He will explain to you all the mysteries of



the syphon-trap, the ventilating shaft, and the grate in the ground which acts as an indraught, and carries a current of air up the shaft.

"We will confine ourselves to the scullery sink that will explain how all waste water either from bath-room or from washing, scrubbing, or cleaning any sort is to be carried away.

"The sink, you see, is to be fixed against external wall of the scullery, and when it is fitted pipe will be led from it through the wall itself.



this pipe will not pass down into the drain-pipe under the ground. It will merely project three or four inches beyond the wall, and all the water that falls out of it from the sink will fall on this grating in the ground, and so pass away into the drain itself.

"This arrangement effectually cuts off all connection between the scullery sink pipe and the drain. It is quite impossible for any bad gases, that might rise from the drain, to find their way into the pipe that leads from the scullery, because they would be condensed into the air before they could reach the pipe.

"I should like you to come and see the arrangements for the bath-room and other outlets, when they are sufficiently advanced," said Mr. Frost, as he wished them good morning. "I shall then have something to say about this grating in the ground, as I called it; it is really another sort of trap."

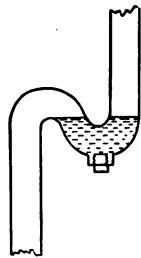
*Summary.*—The outlets from the scullery sink and the bath should never be led down into the ground to join the drain-pipes. They should all end in the open air above ground, so that the waste water may be seen as it flows from them into the drain.

## FURTHER DRAINAGE ARRANGEMENTS

Time passed on, and the work advanced apace, so that when Mr. and Mrs. Hunter paid their next visit to the house, they found not only the roof completed, and the gutters fitted all round it, with the rain-water pipes leading from them, but even the window-sashes all glazed and in their places. It began in fact to look like a house.

Hearing the noise of tools, they went inside, and there they found the floors all laid, the ceilings and walls plastered, and a fine staircase built leading to the upper rooms.

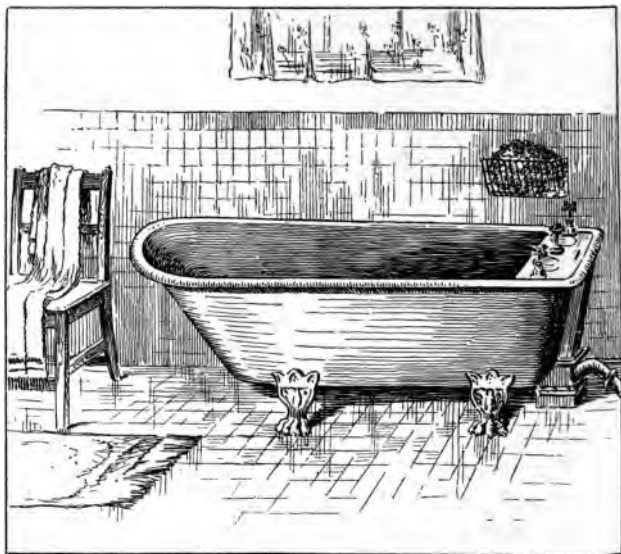
The plumbers had just finished their work with the pipes and other arrangements for the water, and Mr. Frost now came forward to explain the working of these things. Leading the way to the bath-room first, he showed how, by merely pulling up a plug, the water from the bath *was made to run away readily down a pipe fixed along the outer wall of the house.*



A SIPHON-TRAP.

"We will examine the lower end of this pipe presently," he added, "for that is by far the most important part."

He next passed on to the water-closet, to explain the water arrangements there. Pointing to a small cistern about eighteen inches across, near the ceiling,



he said, "This is called a water-waste preventer. It is, of course, for the purpose of flushing down the closets and the soil-pipe. You will understand the working of the contrivance better, if I show you this picture of the inside of it. The chain hangs, as you see, from one end of a bar, and the other end is connected with an *air-tight plug*, which fits into the pipe below it. *This pipe is connected with the bent pipe on the left*

and when the chain is pulled down, and the plug in consequence moved up, the open end of the bent tube acts as a syphon, and drains all the water out of the cistern into the pipe leading down to the closet. There is no further trouble beyond pulling the chain, for the

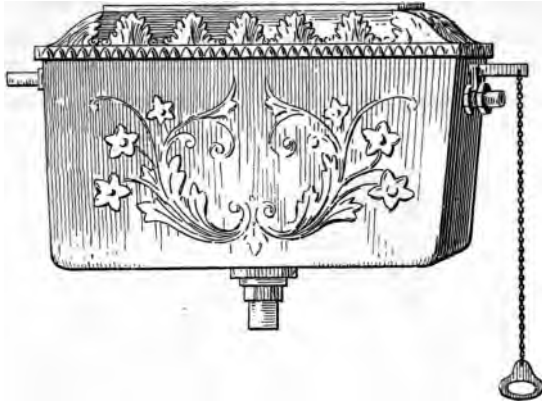


cistern immediately refills itself, and the ball at the back, by floating on the top of the water, effectually stops the inward flow from the supply-pipe as soon as a sufficient quantity has run in."

"I am not quite clear yet," said Mr. Hunter, "why it *should be called* a water-waste preventer."

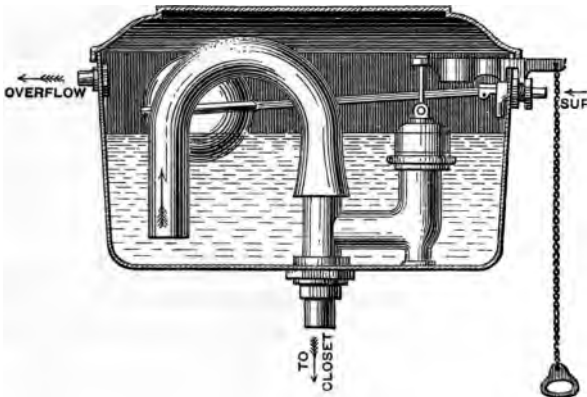
"Well, you see," replied the builder, "the authori-

ties allow a certain quantity of water, as sufficien



WATER-WASTE PREVENTER.

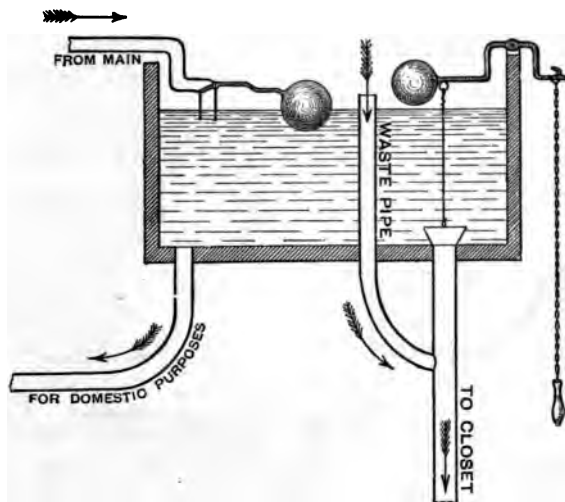
flush the pipe and carry all before it into the se  
This contrivance arranges for exactly that quantiti



SECTION OF THE SAME.

*flow and no more, each time the chain is pulled &  
It thus prevents a useless waste of water.*

"You will understand the advantage of such a contrivance," he continued, "if you examine this picture of one of the older arrangements. The closet in this case is flushed with water from the same cistern as supplies all the water for drinking, cooking, and other domestic purposes ; and there is nothing to



OLD-FASHIONED INSANITARY ARRANGEMENT.

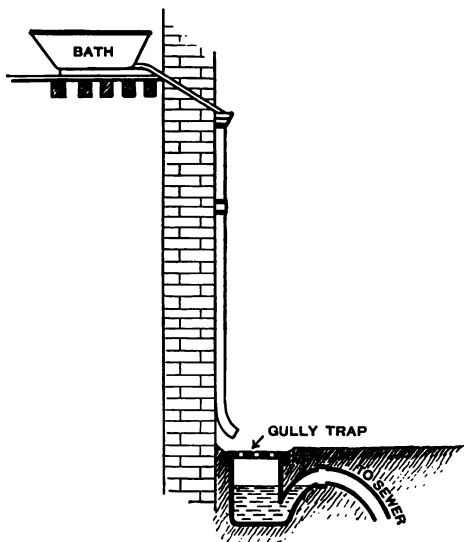
prevent the noxious gases from rising up the pipe into the water in the cistern, to be absorbed by it.

"In the new arrangement there is no connection between the water in the small cistern, or water-waste preventer as we call it, and the domestic supply, and so there is no danger of the drinking-water becoming contaminated in any way."

"The great wonder to me is how people were ever

well," said Mr. Hunter, "with such insanitary arrangements as the one you have just shown us."

"It is a wonder indeed," said Mr. Frost, "but we are learning better now, and every one will benefit hereafter. If you will follow me down-stairs," he added, "I



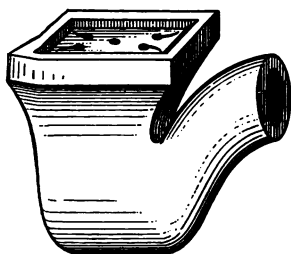
next show you the lower end of the bath-outlet pipe promised."

He led the way, and when they arrived at the place, he pointed out the long pipe leading down the side of the house, and ending in a sort of open ditch which he called the foot of the pipe, about two or three inches from the ground.

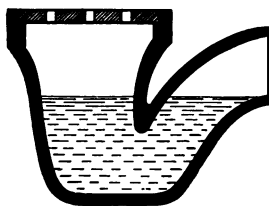
"The first thing I want you to notice," he said, "is that this pipe is not in any way connected with the sewer."

drain. The water which flows down it will pass away through this grating, but there is no chance of any bad smell from the drain finding its way upward into the pipe itself and so into the bath-room, as it would undoubtedly do if the pipe were joined to the drain.

"This grating, as I called it, is exactly the same as the one I showed you below the outlet from the scullery sink pipe; but the grating itself is only part of the arrangement. Below it is a stone-ware trap, known as a gully-trap. Here is a picture of one.



GULLY-TRAP.



SECTION OF GULLY-TRAP.

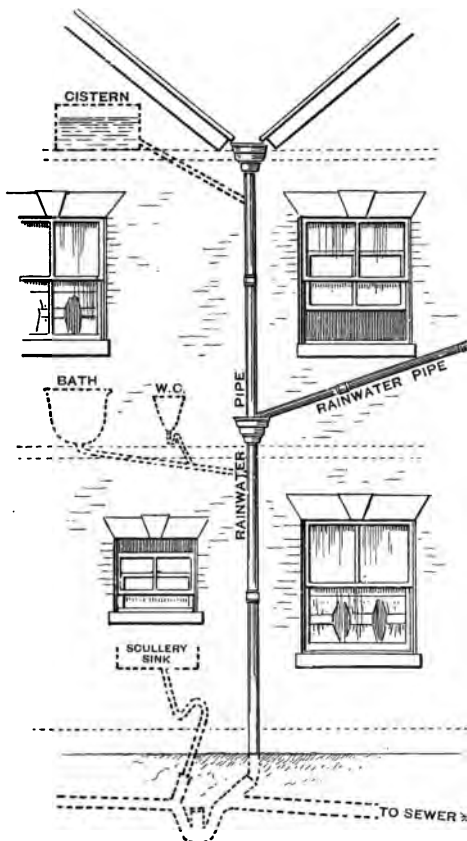
It forms a sort of syphon. The bent tube to the right leads into the drain-pipe, and is securely joined to it by a water-tight junction of cement, to prevent anything passing through into the soil.

"If you look at the section of the gully-trap you will see that the water always stands on a level with the bend in the junction pipe, and the consequence is that none of the sewer-gas from the drain is able to make its way out, because the water in the trap intercepts it and absorbs it."

"Before these gully-traps were invented, all pipes from bath and sinks led direct into the drain, and the only attempt at intercepting the bad gases was by the



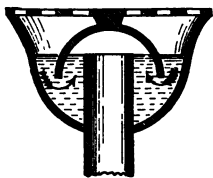
old-fashioned bell-trap which was made to fit the outlet in the sink itself. The evil was that it



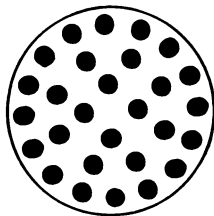
BAD OLD ARRANGEMENT.

*trap was movable, and more frequently the trap was out of its proper place, so that the house was utterly unprotected.*

"Before you go, let me point out to you that even the rain-water pipes leading down from the roof open over a gully-trap; not one of them has any connection with the drain. This, again, is much better than it



SECTION OF BELL-TRAP.



TOP OF BELL-TRAP.

used to be, for it was formerly no uncommon thing to find one of these pipes opening just below a bed-room window; and as the lower end was in connection with the drain, there was nothing to prevent the sewer-gas under such circumstances from rising up the pipe, and filling the house."

*Summary.*—The gully-trap allows the waste water to pass away into the drain, but intercepts all foul gases from the sewer. The water in the trap itself absorbs these gases. Even the rain-water pipes should open over a gully-trap, so as to have no connection with the drain.

## WARMING AND LIGHTING ARRANGEMENTS

A few evenings later Mr. Frost paid the Hunters another visit, for the purpose, as he said, of conferring with them on two matters, which would have a most important bearing on the comfort of their future home.

"The nature of our climate," he said, "makes us dependent, for more than half the year, upon artificial heat, in the shape of fires of some kind, to warm

our houses. Then, too, as evening closes in upon us day by day, we have to make up for the loss of the sun by some sort of artificial light in our dwellings. It is very essential that we all should adopt the best possible means of warming and lighting our homes; but with your new house it is more essential still, for you would not like to be always making changes by and by. Suppose we settle first as to the warming arrangements."

"I prefer the old-fashioned, open fire-grate," said Mrs. Hunter. "The very look of its bright cheerful blaze on a cold day is enough to make one feel warm."

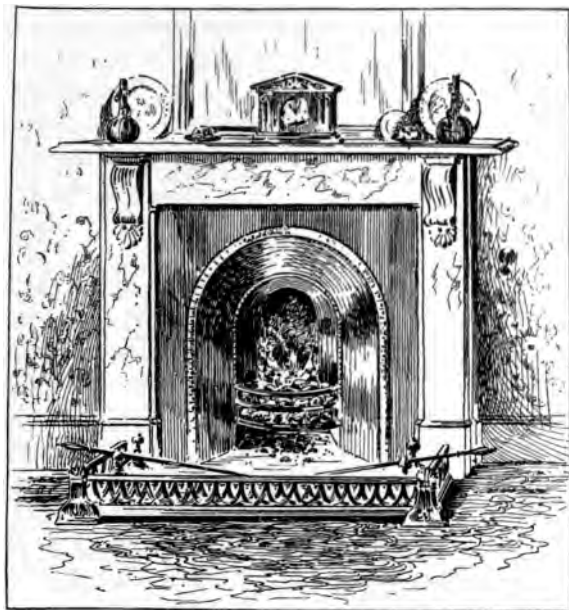
"I should certainly advise you to have an open fire-grate," said Mr. Frost; "but I think I would leave out the word 'old-fashioned,' for several reasons. I have my trade catalogue with me, suppose we examine the various kinds of grates in use, and then you will be better able to make your choice."

"Here is one in very common use, and it possesses the virtue you desire, madam, for it is old-fashioned; but I cannot recommend it to you, for it is faulty in many respects. In the first place, it has to be fixed very far back in the wall, and the result is that a large part of the heat passes up the chimney, and is lost. Then again it is made almost entirely of iron, and as iron is a good conductor of heat, it conducts the heat away into the wall at the back and sides, instead of allowing it to pass out into the room—another loss. Lastly, the bars, both in front and also in the bottom of the grate, are so far apart, that unburnt pieces of coal and cinders easily fall out into the ash-pit, instead of being burnt up; and this of course is another loss."

"I am sure I shall surprise you," he added, "when

I tell you that quite seven-eighths of the possible heat of the fire is lost with one of these grates. Fully one half of it is carried up the chimney with the smoke, and the rest is either conducted away, or lost through the incomplete combustion of the fuel.

"Then, too, the fire in a grate of this kind burns



OLD-FASHIONED FIRE-PLACE.

much too rapidly, because of the open grating at the bottom, which allows the air to enter from below."

"All things considered, then," said Mr. Hunter, "we cannot look upon this as an economical grate, but rather a very extravagant and wasteful one. Mother," *he added, turning to Mrs. Hunter,* "that settles it."

We can't afford to have a thing of this kind, for I do like to get what I pay for, and if I am to buy coals to be wasted up the chimney in this way, it seems to me like wilfully throwing money away."

"I may add," said Mr. Frost, "that all these defects may be remedied, and are to a large extent remedied,



MODERN FIRE-PLACE.

by using another kind of grate—not an old-fashioned one," and he smiled as he repeated the word. "Here is the sort of thing I mean. You will notice in the *picture* that the fire-place, instead of being pushed back *into the chimney*, stands out well to the front, and so *sends the heat* into the room, and not up the chimney.

So much, then, for the first point ; now look at the bars. These, you see, are close together, and upright instead of horizontal ; and in addition to this, the grating at the bottom is shut off from the external air in front.

"All this you can see in the picture, but I may also explain to you that the sides and back of the grate itself, instead of being made of iron, are made of fire-clay, which is a bad conductor of heat, and will not allow the heat to pass away through it, and so be lost."

"Those pretty, glazed, ornamental tiles, too, look very nice," he continued, "but they are not merely for ornament. Their bright polished surfaces cannot absorb or take in the heat ; they reflect, or throw it back, and so do their share in warming the room."

"I clearly see what our friend means, my dear," said Mr. Hunter. "He does not mean that we should try and get every particle of heat we possibly can out of the fire, and so make our rooms positively hot ; but that, if we use a sensible grate like this one, we shall be able to get all the heat we want, by burning a comparatively small fire, and that the fire itself will last longer. Is not that it, Mr. Frost ?"

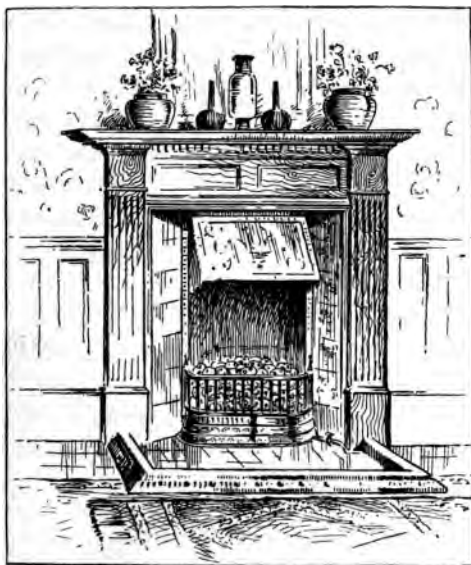
"You have got my meaning to a nicety," replied Mr. Frost ; "that is exactly what I wished to convey."

"Then I think we cannot do better than fix upon this kind of fire-grate," said Mrs. Hunter, and her husband coincided with her in that opinion.

"I think that is a very wise decision," said Mr. Frost. "Of course, the fire-places in the bed-rooms, although constructed on the same principle, need not be so elaborate in character and so expensive as those in the *parlour and sitting-room*. I may tell you that I have provided for a good draught, and therefore complete

combustion of the fuel, by narrowing the chimney the top and bottom.

“Now the next thing to settle is the kind of you intend to burn in your fire-places,” he continued. “With a grate like this you can, if you choose, have gas fire. All that is wanted is a burner in the



ASBESTOS GAS FIRE.

itself, connected by a piece of piping with the ordinary gas-pipes of the house. The grate is filled with plates of fire-clay, which have been kneaded up while pressed with a mineral substance called asbestos. These plates get red-hot with the flame of the gas, and radiate heat into the room to warm it; but they are non-combustible, that is, they do not burn away them-

"A fire of this kind has its advantages. In the first place, it is very clean, for it burns without either smoke or ashes, and consequently there is no dirt. Then, too, it can be turned on and off as it is wanted, without the usual trouble attached to lighting a fire; and, better still, the heat can be regulated to almost any extent by merely turning the tap.

"For a room in which an occasional fire is wanted for a short time, the asbestos gas fire is very useful; but its great defect is that for continuous use it costs nearly four times as much as a coal-fire."

"Then, if that is the case," said Mrs. Hunter, with a malicious little smile at Mr. Frost, "I'll stick to the old-fashioned fuel, if I have to give up the old-fashioned fire-place."

"And now as regards the kitchen," said Mr. Frost, "there are so many excellent varieties of kitcheners and ranges, that I think you and Mr. Hunter had better go to the show-rooms and examine them yourselves. You can then make your own choice.

"The only thing for us to do now is to select from this book the kind of gas-fittings you would like, and then I may consider my business over."

This was a comparatively easy matter, as it simply involved the question of price, and so the warming and lighting arrangements of the new house were completed.

*Summary.*—The modern fire-grate, with its fire-clay back, and its glazed and polished tiles, is more economical than the old-fashioned grate in which much of the heat is lost.

## FRESH AIR IN THE HOUSE

"Good morning, madam; good morning, sir," said Mr. Frost, as Mr. and Mrs. Hunter, some days later,



walked up to have another look at their house. "Oh ! the fire-places," he added, in reply to a question from Mrs. Hunter, "yes, they are all set and ready for use, and we are very busy with another important part of the work now.

"Your model house must never smell close and stuffy," he continued; "I want it to be always fresh and wholesome; so I am putting up ventilators in all the rooms. Perhaps you would like to see them.

"There are many varieties of ventilators in use, but in all my new houses I invariably adopt this one. It is the best I know, but from the very nature of the contrivance it can only be arranged for during the building of the house, as you will easily see.

"In this arrangement a small flue is built close by the side of the chimney, but having no connection with it, so that none of the smoke from the chimney itself can find its way into this smaller passage. It is simply an air-passage, or, as we generally call it, an air-flue. The heat of the smoke as it rises up the chimney, however, warms the air-flue, and, of course, the air in it, and this causes an up-draught, because the air from the room presses upward to drive this warmer, thinner, lighter air before it."

"But how does the air from the room find its way into the air-flue?" asked Mrs. Hunter.

"That is arranged for by a small grating in the wall near the ceiling," replied the builder. "The whole thing is very simple but very effective.

"Of course, as you are aware," he added, "there is *no better natural ventilator for a room than a fire. The fire itself cannot burn without air, and it must take the air it requires from the room. As, therefore,*

it draws in and uses up the air all round it, fresh air must flow in continually from every quarter to take its place, so that there is a constant in-draught of air from all parts of the room towards the fire.

"The fire-ventilation in our case will be even more

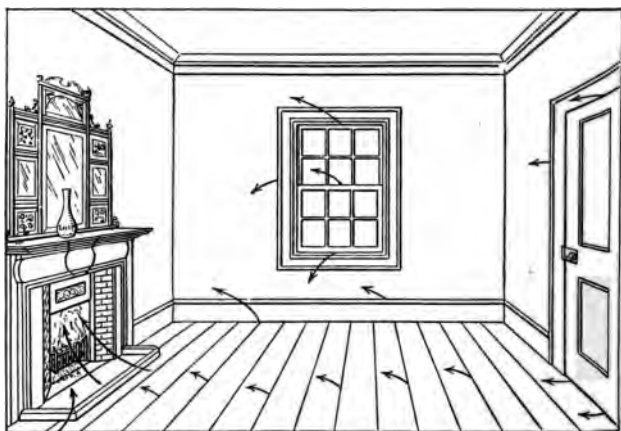


VENTILATING FLUE.

perfect than it usually is, because by narrowing the chimney at the top and bottom I have increased the draught, or, in other words, produced a more rapid current of air. The primary object was to make the fire burn more brightly, but, in addition, it increases the ventilation by robbing the room of its air more

rapidly, and so causing a more rapid flow of fresh outside air into the room.

“Openings are sometimes made in the chimney itself near the ceiling,” he continued, “in order that the heated impure air may be carried off in that way. With this plan of ventilation a valve must be fixed into the opening, to prevent occasional down-draughts



FIRE VENTILATION.

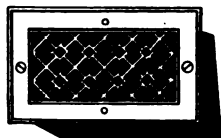
from blowing the soot and smoke into the room. The valve swings readily towards the chimney, and so allows the air-current to flow unopposed in that direction, but closes at once with any pressure from behind.

“There are various forms of valves in use, but the best is the Boyle valve, so called from the name of the inventor. In this appliance the valve itself is made of a thin plate of mica, which is so light that the slightest current of air will move it.

“In the original contrivance, which is known as the

Arnot valve, also from the name of its inventor, the alve was made of a thin plate of metal. The constant licking of this, as it was moved backwards and forwards by the air-current, added to the fact that it easily got out of order and admitted blacks from the chimney, on brought it into disfavour. Both these defects are to a large extent obviated in the Boyle valve."

"Of course our air-flue will afford sufficient ventilation for the room without either of these," said Mr. Hunter, "especially with the assistance of Mrs. Hunter's old-fashioned open fires."



Front View.



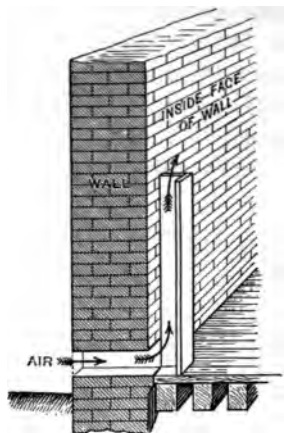
Back View.

BOYLE'S VALVE.

"Yes," replied Mr. Frost, "you will be able to do very well without either of them, although I must remind you that we have simply provided for the removal of the bad air, and not for the supply of fresh air to take its place. You need not, however, be under much apprehension on that score, for fresh air from the outside will be sure to find its way in through every crack and opening to take the place of that, quite as quickly as our contrivances can remove it.

"It is a very different matter," he continued, "with public halls, schools, hospitals, and, indeed, all buildings intended to accommodate large numbers of people. In these it is necessary to provide for an abundant in-  
 sight of pure air, as well as to leave an outlet for  
*escape of the bad.*

"The great thing in all these cases is to requisite supply of pure air without causing



TOBIN'S VENTILATING TUBE.

to give the inmates a few weeks ago I put Tobin's ventilator in the Lecture Hall for purpose. This consists of a tube or wooden casing in height from four to six feet, according to the height of the room, and a lid which moves down on a hinge like the lid of an ordinary box.

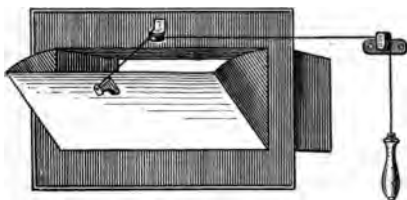
"The tube is fitted against the outer surface of the wall, and a hole is made in the wall itself near the bottom of the tube. This is the whole arrangement except that the opening in the wall is protected by a simple flap, and the top of the tube itself by a piece of canvas sacking to intercept the dust."

"It seems a very simple affair," said Mr. M. "What is the special feature in its working?"

"I will tell you," replied the builder. "The tube, with which the air from outside rushes up, gives it an upward tendency, even when the wind enters the room itself. The current continues in the same upward direction towards the ceiling, where it mingles with the warm air of the room, and is itself warmed before it falls. There is, therefore, no danger of a draught of cold air on the heads of the inmates."

who are sitting in the room. In very cold weather the current can be regulated as required by means of the lid.

"The Sheringham Valve acts on much the same principle, by directing the air which it admits in an upward direction. An opening is made as usual in the external wall and a sort of iron box is fitted into the hole. The front of the box moves on a hinge along its lower edge, so as to allow it to open into the room. It forms, in fact, a valve, which the pressure of the outer air is capable of forcing open; and as it is pro-



THE SHERINGHAM VALVE.

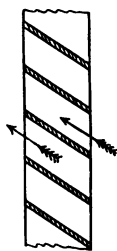
vided with a string and a pulley, it can be closed when the wind is too strong, or regulated to any size.

"I have made use of the windows to ventilate the bedrooms," continued Mr. Frost. "Come and see," and he led the way upstairs.

"This arrangement is known as the Louvre system. You see, instead of one of the ordinary panes, I have fitted in the upper part of the sash a number of parallel strips of glass, slanting inwards and upwards. Air from without will have free access, and will, at the same time, be directed upwards. Louvres are sometimes fixed and immovable, but these, you will observe, are made to move like the laths of a Venetian blind, so that you

will be easily able to regulate the amount of air according to the weather.

"Now notice this other contrivance known as Cooper's Ventilator," he continued. "Here we have a



LOUVRE  
VENTILATOR.

circular disc of glass fitted close against one of the panes of the window. The disc revolves on a pivot through its centre, and five oval holes are cut in it. There are five corresponding holes in the pane itself, and consequently, when you wish to admit fresh air into the room, you will simply turn the disc round so that its holes are exactly in front of those in the pane. In this case, too, you can easily regulate the amount of air, by so turning the disc as to cover up part of the hole."

*Summary.*—An open fire is the best natural ventilator for a room. In every appliance for ventilating a room the object must be to remove the foul air and admit fresh without causing a draught.

## DECORATING THE HOUSE

Days flew by and the house was fast approaching completion, when Mr. Frost, with a large roll under his arm, paid the Hunters another visit, for the purpose of having a final conference with them.

"I have done all I could," he said, "to make your new house a healthy one in every respect. The finishing touches, in the way of decoration, are a matter for your own taste and judgment. It will depend on your own choice whether, after all, you have a beautiful artistic home, which will be a pleasure to yourselves and others, or ugly, garish rooms which can please

nobody. I shall be glad to advise you as far as I can."

Mr. and Mrs. Hunter both felt so much reliance on the judgment of their friend, that they at once agreed to leave the whole matter in his hands.

"Well then," he said, "let us commence with the woodwork of the house; that must be painted, in the first place, to preserve it, and also to give it a more agreeable appearance.

"Now most paints contain white lead as their principal ingredient, and this is a very poisonous substance. The turpentine, which is used for mixing the paint, is of a very volatile nature; and, as it flies off into the air during the drying period, it carries with it small particles of this white lead.

"For that reason it is very unhealthy to sleep or even sit in a room which has been newly painted, as it gives rise to many serious disorders. I am very anxious, therefore, to get on with the painting work at once, for we must have the smell of the paint all gone before you take up your residence in your new house.

"If we use these lead paints, as I suppose we must, for the others are very expensive, I would advise you to varnish them. You will then get a hard polished surface, quite impervious to moisture, and capable of being easily washed down from time to time. Varnish is a preparation made by dissolving resin in turpentine, methylated spirits, and oil. It makes a splendid surface for painted woodwork of all kinds. Before laying on the varnish it is necessary to give the painted surface a couple of coats of size, as this helps to make it *more impervious still*.

"Now a word of advice as regards the colours," he



continued. "Greens of every description are best avoided, as almost all of them contain arsenic, which is a most virulent poison; and this will apply not only to the paint, but even with more force to the wall-papers, when we come to them.

"It is not at all an uncommon thing to find people suffering from a prolonged state of ill-health, which the doctor has been utterly unable to cope with, until the real cause has been discovered in the walls of the rooms which they have occupied. The arsenic, either from the paint-work or the wall-paper, has peeled off and been carried into the air, in the form of minute particles of dust. In this state the arsenic poison has found its way into the person's system, and given rise to diarrhoea, nausea, headache, internal pains, loss of appetite, sleeplessness, and very often to inflammation of the eyes. It is a well-known fact that in all such cases the patient invariably begins to mend, as soon as a change is made into another room; and this is sufficient to point out the cause of the illness."

"But are not the silicate paints the best to use?" asked Mr. Hunter. "I believe they are entirely free from poisonous substances."

"Well yes, they claim to be free from poison matter of any kind," replied Mr. Frost. "But in spite of that I prefer the lead paints. Although very many substitutes have been suggested, nothing has yet been discovered that supersedes genuine white lead for preserving woodwork. This I may say is the opinion of the trade generally; and then as for arsenic, well we can always avoid that either by not using greens at all, or any other questionable colours for internal decoration, or by purchasing the colours from honest,

reliable tradesmen. Remember it is quite possible to have these colours without arsenic.

"Now as regards the walls themselves," he continued, "I have given you well-plastered walls in all the rooms, but the plaster if left as it is would not be good, for it is very absorbent, and would quickly absorb organic impurities from the air, and so render the rooms unhealthy. Thus it is that, both on the score of utility and also for the sake of appearance, we find it necessary to cover the walls with a covering of some sort. The best covering of all would probably be paint, but that would be very expensive, for the new plaster, from its absorptive nature, would suck in an enormous quantity of paint. Otherwise, for smooth, well-plastered walls there is no better covering than paint and varnish; but even then if once the surface gets damaged and broken, the plaster is left exposed, to absorb impurities from the air.

"I would advise you to have the scullery walls colour-washed. For this a mixture of lime and water, with a little colour, of whatever kind you please, is all that is wanted. It is very inexpensive, and so may be easily renewed from time to time, but it has one drawback,—it rubs off if it is touched. It goes without saying, of course," he added, "that the ceiling will be distempered with a white-wash, made of whiting and size; and I would remind you that, when you get settled in your new home, all ceilings should be white-washed at least every two years, because of the absorbent character of the plaster itself. The purpose of the size is to fill up the pores in the plaster, so as to render it less absorbent, and this it does while it lasts, but it must be renewed from time to time."

"I think we must have paper on all the rest of the walls," said Mrs. Hunter. "After all it will be less expensive, and much more cheerful and cosy in appearance than anything else. The kitchen would look very nice with an oak paper."

"Yes, it would," replied Mr. Frost; "and if it were well sized and varnished, you would find it very serviceable too, for very little dust would lodge on its smooth polished surface, and it could be easily washed down when required. I would recommend you to have tiled paper, similarly sized and varnished, for the bath-room and water-closet, and for the same reasons.

"Suppose we now have a look through this book of patterns," he continued, as he opened the large roll and spread it out on the table; "then you will be able to make your own selection. You may take my assurance that there is no trace of arsenic in any one of them, for they are all sanitary papers; and whenever in the future you may be buying wall-paper, let me advise you, first of all, to make this point certain. I ought to warn you, too, that arsenic is not confined to green papers, for it frequently happens that blue, red, brown, and mauve, as well as the most delicate grey, and even pure white papers, contain this poisonous substance in dangerous quantities.

"One more word of advice for the future," he added, "and then we will proceed to select the papers for the various rooms. When it is necessary to re-paper a room, never consent to have one paper pasted up over the other. Remember, that cleanliness is, or ought to be, the object of re-papering, and that there can be very little cleanliness where the new paper is pasted up over the old. All the dirt and

impurity are there, but in a worse form than ever, because they are covered up, and hidden away from sight. In hanging the paper too, insist that none but fresh size and paste are used. It not unfrequently happens that, either from ignorance or carelessness, workmen will use size and paste that are bad and putrid; and the putrefying smell arising from them is very liable to cause serious illness in the household.

"Now let us look through the pattern-book," he said, turning the leaves over one at a time.

"I don't think we will give a second thought to these flock-papers," said Mr. Hunter, "or to any others that have a raised surface. They may look very beautiful at first, but those raised surfaces soon become loaded with dust and other impurities from the air; so they cannot be healthy."

"Neither will we have anything to do with great glaring patterns, and 'loud' colours of this sort," said Mrs. Hunter. "The very look of them day after day would be wearisome to the eyes."

The result of their selection was that each room was provided with a paper exactly suited to it. When all was finished, there was no such thing to be seen as a small room with a large-pattern paper to make it look smaller still; and all the rooms on the sunless side of the house were made brighter and more cheerful than they otherwise would have been, by the bright yet simple colours of the paper on the walls.

"Oh, how I wish my darlings were back, to see their new home," sighed the lonely, longing mother, a hundred times each day, as they waited for the house *get dry and habitable*.

*Summary.*—Cheap, common wall-papers are very injurious to health, as they contain arsenic, which is constantly being given off into the air. Plastered walls, unless covered either with paint, or with size and whitening, are very absorbent. They absorb organic impurities from the air.

## FURNISHING

"How much longer do you think it will be, John, before our house is fit for occupation?" asked Mrs. Hunter, whose mind was still running on her absent children.

"Well, my dear," replied her husband, "we shall have to be patient and wait a little longer yet. You see, it would be most unwise, after taking so much trouble to secure a permanently dry house, with dry foundation, dry roof, and dry walls, to go into it before the bricks and mortar have had time to get dry.

"I have known instances in which whole lives have been ruined, as the result of such undue haste; and if we went into the house now, we should in all probability live to regret it, for, depend upon it, rheumatism in all its forms lurks behind those walls yet.

"No, there is no help for it, we must be content and wait; and as for the dear children, they are best off where they are, especially as we know they are well and happy."

"True, we have had a very exceptionally dry, warm season," he added, "and Mr. Frost is keeping good fires in the rooms to help dry the walls. But he knows the house is not yet fit for occupation, for he still postpones papering the walls. That, which he calls the finishing stroke, he intends to leave till the last few days. He says, and I quite agree with him, that it is *little short of madness to go into a house before it has had time to get properly dry.*

"However, we shall have enough to occupy our minds, as you have decided to furnish several rooms afresh. Suppose we discuss the furniture now."

"I shall be very glad to talk it over now, John," said Mrs. Hunter, "for we shall then be able to go to the shop to make our purchases with our minds made up."

"Now, in the first place, I never intend to carpet the entire floor of any of the rooms for the future. A carpet, fitting the room, and permanently fastened down, is simply a trap for dirt, and in time becomes loaded with all manner of filth, which is sure to be brought in by the feet, however careful one may be."

"I have always tried my utmost to keep every room clean and wholesome, as you know, but I have been surprised, after sweeping a carpeted room, to see the amount of dust which settles on everything in it. I have wondered where all the dirt could come from, but of course there is only one answer. It came from the carpet, and unfortunately there is always plenty more where that came from."

"Yes, my dear," replied her husband, "and if that dust were examined under a microscope, it would be found to consist not only of particles of dried mud, but of almost every sort of organic matter. This, as you are aware, from its very nature is constantly decomposing, and that decomposition cannot go on without rendering the air of the room impure with the bad gases which it gives off."

"Well, John, I have made up my mind to have carpets, for the future, that can be easily taken up, so that both they and the floors under them may be regularly and properly cleaned. In the lower rooms we might have a carpet in the centre, and the floor all round

could then be stained and varnished to make a border. In the bed-rooms the less carpet we have the better certainly we will have none at all under the beds."

"I am glad you have come to that decision, dear," said Mr. Hunter, "and as for the floors, I will at once set Mr. Frost to paint and varnish the borders so that they may be ready. They will require three or four coats of good oil paint before the varnish is put on."

"The next thing to consider is the kind of carpet which will be most serviceable," he added, "and here I must say that I consider it very unwise to buy any of the so-called cheap carpets. Most of them are made to look very well with their bright attractive colours and patterns; but the surface soon wears off and then they rapidly fall to pieces, because they are largely composed of jute, a substance which will stand very little wear and tear. Articles of this kind may be low-priced, but they cannot be called cheap."

"Felt carpets are almost as bad, for they soon lose their surface, and are liable to stretch, so that they soon become untidy in appearance. Indeed I have long since come to the conclusion that the best carpets are by far the cheapest in the long run."

"Our means will not allow us to think of the very best, or I should advise a good pile carpet for the bedroom. These carpets are rich and luxurious to a degree and they are at the same time the most durable, but unfortunately the price will not suit us, so we need think no more about them."

"The most serviceable carpet within our reach *therefore, is a good Brussels. We can have it made square or oblong, with a suitable border, and this with the polished floor all round will make an elegant*

covering for the best room. Don't you think so?"

"Yes, John," replied Mrs. Hunter, "that is exactly what I should have proposed. Of course we might get a tapestry for less money, but it would also be much less durable, because the back or body of the carpet, instead of being made of strong linen threads for both warp and woof, is made as a rule of cheap yarn, which is often spun from cotton waste.

"Young, inexperienced people are often deceived in having tapestry carpets palmed off upon them for Brussels; but a Brussels may be always known because the colours of the pattern can be seen on the wrong side."

"Do you know, dear," she added, "I want to have a linoleum for the living room. It is clean and does not hold the dust, and it can be frequently washed with soap and water."

"Very good," said her husband, "but remember I cannot consent to have it fixed to the floor with cement, as is sometimes done, because in the first place it ruins the flooring, and then besides it should be laid so that it may be taken up occasionally."

"But come," he added, "don't you think we have spent long enough over the floors? Suppose we think of the other requirements now."

After considering the matter for a long time, they came to the conclusion that, as they were merely adding necessary articles, and not furnishing their house throughout, as people do when they start house-keeping, it would be better to wait and attend a sale of second-hand furniture somewhere. Mr. Hunter said it was often possible to buy thoroughly good second-hand



articles in this way, for less money than give for showy, but badly-made new ones.

"There is only one thing I want in this," said Mrs. Hunter. "I shall be glad to get our wooden bedsteads, and straw palliasses, or of cleanliness. Nothing is so clean as a bedstead with a spring mattress to fit it, for even so easily seen and examined, that vermin can harbour in it. This, with a good horse-hair mattress on it, makes a bed fit for a queen, certainly to be preferred to a feather bed."

*Summary.*—Carpets should not be permanently fastened, as they become traps for dirt and filth, which is brought in.

## HOME AT LAST

Home at last. Yes, Norah and Bob are home to-day, and, wonderful to tell, uncles who have lived all their lives in the heath country, have actually been induced to try home for a week. Whether it was that they did not want to send the dear children home alone, or whether it was a growing curiosity to see the new house, about which they had heard such glowing accounts, it is hard to say. But great was the surprise when Mrs. Hunter one morning received a letter that they were all coming up together, and that the uncle and aunt had arranged to stay a whole week. And now, when the day has at last arrived, it is a puzzle to decide at which end of the journey to find the greatest fluster. With uncles and aunts, as they are to long journeys by rail, this day is one of life's landmarks. Their fluster of

has been very unmistakable, for they have been making preparations for the event for weeks past.

The children, too, are naturally brimming over—bursting with excitement, for, happy as they have been at the farm all this time, their sleeping and waking thoughts are now on “Home, sweet Home.” There is no denying the fact; they are home-sick. Mother’s kiss would now be more to them than all the world. It requires very little imagination to picture their state of flutter and excitement.

Mother again is almost as bad at home, for isn’t she to have her darlings back to-day—her two whom she had so sorely missed all these months? Fortunately she is too fully occupied, busy little woman as she is, to give much time to the indulgence of her feelings. Still, all through the day as she goes about her duties, the one thought, the one great longing is uppermost in her mind. They are coming home.

Yes, she and father too are both very busy, for they are now in their beautiful new house on the hill, and they have been toiling from early morning till late at night, utilising every moment at their disposal, to get all straight for to-day. How proud they are of it, too, and with what an air of proprietorship they look round on it, knowing that it is all their own.

As the hardest part of the indoor arrangements are now made, father has gone back to his garden, to which he is devoting all his spare time. He had taken the garden in hand before the house was actually finished, so that it is not only neat and tidy, but already shows great promise for the future.

*But let us peep in at mother, as she bustles about, busy with the final touches here and there—those in-*

describable touches which give all the finish, make the home in some mysterious way home-like, and everywhere proclaim the presence of the woman.

It is indeed an artistic little home, but more by far is due to her good taste than to the expensiveness of the furniture. Mr. Hunter has been often heard to say, "A woman like my wife would change a cottage into a palace."

It was her good taste which settled the wall decorations, so that the papers on the walls themselves are not only exactly suited to each particular room, but are made to blend so artistically with the paint-work everywhere; and the same care has been taken in the selection of carpets, curtains, tablecovers, and drapery of all sorts.

"Loud, staring reds, and blues, and greens are my aversion," she would say. "My home is not to be a gaudy show, but a haven of rest; then give me soft, restful tints, not bright staring colours, which after all have only a patchwork effect, and weary the eyes."

Even the pictures were chosen with the same artistic eye to the surroundings. She was not the kind of woman to hang her rooms with cheap tawdry prints, just for the sake of having pictures of some sort. "Fond as I am of pictures," she would say, "I would much rather have bare walls, than offend the eye with the loud garish things one sometimes sees."

Hence, as they are not wealthy enough to afford oil paintings, and her good taste would rebel against cheap imitations, she has contented herself with a few artistic prints and engravings in simple oak frames, and these add to the general effect rather than detract from it. Her bedrooms too are a model of neatness and comfort, and her wise decision of refusing to have these rooms

arpeted all over will render it an easy matter to always keep them so, for there will be no harbour for the accumulation of dust and dirt.

Then again, she has made up her mind that her home is to be for real use, not show.

"I have no desire," she says, "to keep rooms merely for show purposes. They are supposed to be for our use and enjoyment. It is really painful to me to see a room so elegantly furnished, and so rigorously kept, that one is almost afraid to sit down in it. To my mind, a room such as that, in spite of its elegance, has no real beauty in it. Let me have utility first, and elegance and show afterwards. Such a room, indeed, can be little better than a Bluebeard's Chamber in any home where there are children, and I live for my children's happiness.

"I consider it not in the light of a parental duty, but rather as a privilege and a pleasure, to make home a bright, happy place for the little ones. We cannot tell what hard knocks and buffets the world may have in store for them. Let us do all we can to make their childhood days happy."

Let us take just one peep at her windows, before we go to meet the children. She is very proud of her windows. While she would not think of filling them with ornaments, as some vulgar people do, to show off, as she says, she has a natural love for flowers, and takes a pride in her window plants. "But how could I fill my windows with flowers, if the curtains were allowed to get dirty and untidy?" she would say.

No, her windows upstairs and down are a picture of neatness. *The short muslin curtains at the bedroom windows are stretched on a lath, not threaded on*

a piece of tape. The consequence is they never hang loose and untidy in the middle.

How refreshing it is, too, to see her as she stands now, eagerly on the watch for the children, at one of the bedroom windows. She has been very busy all day at all sorts of work; but in spite of that she is



still her neat, tidy, wholesome-looking self. Some people one meets with cannot polish a grate without polishing their face at the same time.

But what is that rolling, rumbling sound, which causes her heart to beat, and sends her down the stair at such a rate? It is the children: they have come home at last.

Good taste and simplicity are more conducive to home than showy furniture and surroundings, how

## THE WATER-SUPPLY

We must pass over the incidents of that happy home-coming, and the grand doings in the way of sight-seeing, which followed during the next week, by simply saying that they long lived in the memories of all. The children, it is needless to state, were charmed with their new home; and uncle and aunt thought they had never seen such a compact, convenient little house in their lives.

One of the greatest surprises of all to them was the water-supply. These country people, accustomed as they were to go to the pump and the well for their water, were astonished beyond measure when they saw that, upstairs and down, they had but to turn on the taps to get hot water and cold ready to hand.

"Yes," said Mr. Hunter, "it certainly is very convenient. Indeed I look upon it as a great blessing, especially in a town like ours, to have a plentiful supply of water; because pure wholesome water for drinking, cooking, washing, and cleansing purposes of all sorts, stands next in importance only to fresh air. I am glad to say we are very well off for both here."

Then of course Uncle Sam, to whom these town arrangements were all new, began to make inquiries about them.

"The water-supply of our town," said Mr. Hunter, "is drawn from the head-waters of a stream about twenty miles distant. It is first led into a large artificial lake not far from the spot where the stream is tapped. This is known as the Collecting Reservoir,

and from it the water is carried by means of an aqueduct to another great artificial reservoir on a hill about six miles from the town. This is called the Service Reservoir, and is built with strong solid masonry to withstand the pressure of the water.

"The water is brought into the town itself by means of immense underground pipes, or mains, made of cast-iron. From the mains smaller pipes lead up to the various roads, and these in their turn send out smaller branches still to the individual houses.

"Before it is sent into the mains the water is made to pass through the filtering beds for cleansing purposes. I need not tell you, of course, that the reason for placing the Service Reservoir on a hill is to enable the water to flow of its own accord along the mains and pipes, not only into the houses of the town but into the upper stories of the houses. Water, as you know, will always flow till it finds its own level; therefore the hill is much higher than the highest houses in the town; there is no difficulty in supplying them from that source.

"In some cases, where the general character of the neighbourhood is flat, the water has to be pumped from the filtering beds into immense tanks raised considerably above the ground, and it is afterwards sent from these tanks into the mains for delivery."

"My pumps and wells at home are all supplied from deep springs," said Uncle Sam; "but it is not good water, owing to the chalk it dissolves during its passage through the earth. It is delicious water to drink, but it is not so good for washing purposes, because of its hardness, and it furs all our kettles in no time."

"But then it does not matter much, so far

washing is concerned, uncle," said Norah, "for you always have plenty of nice rain water for washing."

"Our water, you see," said Mr. Hunter, "coming as it does from the head-waters of the stream, is neither very hard nor very soft. Indeed, it is excellent water for all purposes, better than that of most towns, although I must say a glass of your delicious spring water is more to my taste.

"We are very well off here, too, in another sense," he added, "for we have a constant supply; that is to say, our pipes are constantly filled with water. In some places the supply is intermittent, or, in other words, the water is turned on from the mains only for a certain time each day.

"Where this is the case, cisterns are necessary, and are supplied to all the houses for storing the water. We have no need of a cistern, as whenever we turn on our taps, we find water in them. The water, too, coming direct from the pipes, is as pure as it was when it left the water-works, and this cannot always be said of the water which is drawn from a cistern.

"Come and see our arrangements for the hot-water supply," he added, and he led the way into the kitchen, Aunt Jane and the children of course following them.

"See," he said, as he opened a cupboard close by the kitchen fire-place, "here is a small iron cistern covered with a lid, which always fits close as it is now, but can be easily removed if necessary."

He lifted it off as he spoke, and showed them a small ball-tap inside, with the ball floating lightly on the surface of the water.

"*This tap,*" he went on, "leads direct from the *main, and without any interference on our part, always*



keeps the cistern full, as it is now. At present no water is running in, because the cistern is quite full, but if I turn on one of the hot-water taps, you will see the water in the cistern gradually begin to sink.



The ball will sink with it, and immediately more water will flow in from the ball-tap, and continue to flow, till the cistern is as full as it was when we first saw it."

*It was worth all the trouble to see the wonder of*

the faces of these simple people. "What a clever contrivance," said Aunt Jane; "it is really wonderful."

"But I can't see yet the connection between this the cistern and the hot-water taps," said uncle.

"You shall see it all in a moment," said Mr. Hunter. "The cistern, you observe, is exactly on a level with the boiler of the kitchen range. This pipe from the bottom of the cistern leads into the boiler, and so the natural effect of the water trying to find its own level is to keep that which is in the boiler exactly level with this in the cistern. The hot-water taps, of course, draw their supply from the boiler, and as it at once lowers the level of the water, not only in the boiler, but also in the cistern, and fresh water enters the main as you saw it just now."

"Well, this certainly beats anything we've got in the country," said Uncle Sam, his broad, honest, jovial face a perfect picture of astonishment and delight. "This is something like a constant supply, and no mistake."

"I may tell you, though," continued Mr. Hunter, "that even a grand and useful arrangement like this may be a source of great danger in careless hands. But, you need not fear now," he added, as they all drew back. "There is no danger at present. It is in the winter time, during a hard frost, that the danger comes. The danger then is that, if from any cause the boiler gets dry, it is very likely to crack. That after all would simply be the danger of an expense; but there is a worse one than that."

"This little pipe leads direct from the boiler, and for the express purpose of letting off the steam when the water boils. In a very hard frost it has sometimes happened that this pipe has frozen during the

night after the fires have died down. In such a case when the fire has been re-lighted in the morning, the steam from the heated water, having no vent, has been unable to escape, and a terrible explosion has followed. We must take care during the hardest of the winter weather to see, first of all, that the boiler is always full, and then that the vent pipe is always free, before the fire is lighted in the morning. With that amount of care there is not the slightest danger.

"You may depend upon it," he added, "we won't be all blown up for the want of a little care," and he smiled at Aunt Jane's rather gruesome face.

*Summary.*—In winter the small pipe for carrying off the steam from the kitchen boiler is liable to get frozen during the night. Never light the fire in the morning without looking to see that this pipe is free, or there will probably be a terrible explosion.

#### ANOTHER CHAT ABOUT THE WATER

"I am afraid we shall be some time getting used to our old-fashioned wells and pumps again at home, after your splendid water arrangements here," said Aunt Jane, with one of her pleasant smiles.

"Ah, my dear," replied Mrs. Hunter, "you have only to think of the great need there is of water in a big town to see in a moment how utterly inadequate your walls and pumps would be to meet the requirements. You may perhaps be surprised to learn that our authorities base their calculations on the average rate of thirty gallons a day for each individual."

"Thirty gallons a day, my dear," exclaimed Aunt Jane. "Why, you could never use it."

"No, the individual would never use it," replied Mrs. Hunter, "but then think how much is required for

flushing the water-closets, drains, and sewers, and for watering and cleansing the streets, in addition to personal needs. You know nothing of all these things in the country. All the water you require is for the simple purpose of cooking, drinking, and washing, which we, by the by, must have as well as you.

"No greater calamity could happen to a town like ours than a failure in its water-supply. Even a temporary deprivation of water is quite sufficient in a short time to affect very seriously the health of the whole community."

"What is the topic of interest now?" asked Mr. Hunter as he and Uncle Sam came in from a walk.

"Well, I am not quite sure that you town people are not a very dirty race," said Aunt Jane. "Fancy, dear," she added with a mischievous smile, addressing her husband, "every individual in the town requires no less than thirty gallons of water a day, and then they are not all clean."

"The figures, however, are quite correct," said Mr. Hunter. "Ours is not a very large town, but it is estimated that we consume over a million gallons of water each day. Think what the supply must be for London, with its five millions of inhabitants."

"As we have come back to the water question," said Uncle Sam, "I must say I think your constant supply direct from the pipes ought to be a great advantage over an intermittent one where the water has to be stored in cisterns."

"It is a great advantage in many ways," said Mr. Hunter; "but the greatest of all to my mind is that we get our water pure, or as pure as the water company can supply it, at any rate. I assure you I have seen an horrible sights in the cisterns of some houses."

"True, it is the fault of the people themselves when the water from their cistern is impure, and could easily be avoided with a little care and attention. All cisterns should be regularly examined and scrubbed out with a stiff brush at least once during the year and to make this a simple matter they should be placed so as to be easy of access. The cistern too should always be kept covered with a close-fitting lid for otherwise, not only dirt and dust, but dead leaves and other decomposing vegetable matters, will readily find their way into it, and render the water impure to say nothing of such horrid, unspeakable things as dead cats, birds, rats, and mice, which have not unfrequently been met with."

"Oh, how dreadful," said Aunt Jane, with a shudder. "I think I'll try and be content with our old pump when I get back after all."

"Then again," continued Mr. Hunter, "water is ready solvent for gases of all sorts, and for this reason the cistern should never be placed within the reach of noxious gases of any kind. One of the worst situations for a cistern is over the water-closet, and yet until quite recently that was a common place for it. Indeed the cistern was fixed there, in order that the one supply might serve both for flushing the closet, and also for drinking and other domestic purposes. Our authorities I am glad to say, have put an end to that, for it was impossible to prevent the entrance of noxious exhalations from the closet into the water in the cistern.

"How horrible and disgusting," said Aunt Jane. "I never heard of anything so dreadful. I wonder that people, who had to drink such water day by day were ever free from disease and sickness. It was

certainly time for some one to interfere and put a stop to such filthy arrangements."



MICROSCOPIC VIEW OF SOME DROPS OF WATER TAKEN FROM  
A LONDON CISTERN.

"How do they manage to prevent the cistern from overflowing?" asked Uncle Sam.

"Well, in the first place the water enters the cistern from the supply pipe by means of a ball-tap.

similar to the one in my little cistern for the boiler," replied Mr. Hunter. "The ball floats on the top of the water, and of course rises with the water, so that when the cistern is full, the ball itself shuts off any further flow. Besides this, there is always an overflow pipe leading from the cistern, which acts if the ball-tap should get out of order."

"I suppose cisterns, wherever they are used, are made on much the same pattern," said Uncle Sam.

"Well no, they are not," replied Mr. Hunter. "Some are made of wood, some of slate, and others again are made of lead, zinc, and galvanised iron. In the basements of large buildings stone and brick cisterns are used, but the brick-work itself requires to be lined with a thick coat of Portland cement."

"I should think wood must be a very bad material for such a purpose," said Uncle Sam, "for it would be sure to rot away in time, and contaminate the water."

"Yes, you are right," replied Mr. Hunter. "If I had one of any kind, I should prefer a slate cistern, but they are apt to leak in the joints, and then it is usual to stop the leakage with red lead, which is a very poisonous substance. I am glad in every way we have no cisterns at all.

"Sheet lead is frequently used for cisterns, although it is not without its defects, for water acts as a solvent on the lead itself, forming a poisonous coating of rust or tarnish all over its surface. It is a curious fact, however, that when once the water has formed this coating, the lead will not rust any more. The coating *itself*, by adhering close to the surface, forms a *protection for the water* against further lead poisoning. Such *cisterns*, although they require cleaning as well as

thers, should not be scrubbed with a brush, as that would rub off the protecting coat of tarnish, and leave the lead exposed again to the action of the water."

"People who have leaden cisterns are strongly advised not to drink the water which has stood for any length of time in them; and for the same reason the taps should always be turned on before filling the kettle in the morning, in order to run off the water which has stood all night in the leaden pipes."

"Thank you," said Uncle Sam. "You have taught me more about water than ever I knew. Your arrangements here are simply perfect, I should say, but I don't think I should like those unsavoury cisterns. In fact, if I had a cistern at all, I would take good care to see that it did not get unsavoury through dirt and neglect, for I am sure I could never drink the water from it.

"But I say, mother," he added, with a merry laugh, "after seeing all these grand town arrangements we must not learn to despise our own old-fashioned constant supply in the country, although it does not give us hot and cold water ready to hand."

"I love the dear old pump," said Norah. "No one shall say a word against it while I am near."

*Summary.*—Cisterns require to be frequently examined, and well scrubbed out at regular intervals. They should never be placed within reach of noxious gases, for water absorbs gases of all sorts.

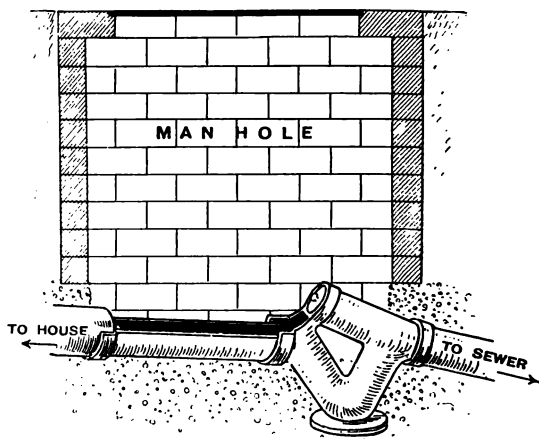
## A CHAT ABOUT DRAINAGE

One at least of our visitors from the country was deeply interested in the sanitary arrangements of the house as in the water service, and that was Uncle Sam. The entire absence of smells of any kind



completely puzzled him, and Mr. Hunter found a very appreciative listener while he was explaining the working of pipes, traps, gullies, ventilators—everything connected with the system.

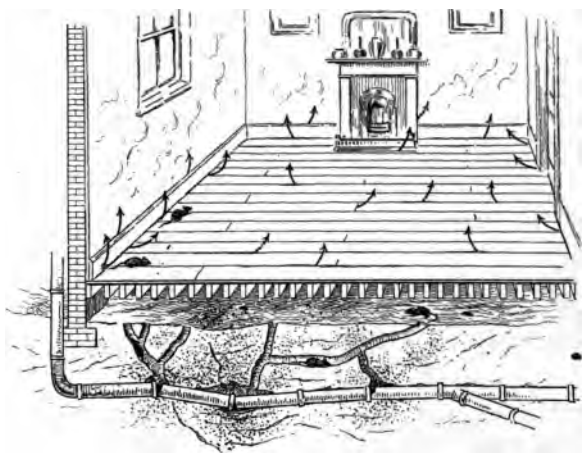
The water-waste preventer, for flushing the closets, he looked upon as one of the cleverest contrivances he had ever seen; and he was much struck too with the device of intercepting the foul gases by means of water-traps in the pipes themselves.



“These pipes leading from the individual houses into the road—the drains, as we call them—enter the sewer which runs under the roadway,” explained Mr. Hunter. “Other drains and channels run along the streets and roads, by the side of the footpath, to carry off all the surface water, and this too is eventually drained and trapped into the common sewer. The heavy rains which would otherwise flood the roads and *streets rapidly flow away along these channels and*

disappear down the wide open gratings into the sewer itself; and this water of course serves a useful purpose in helping to flush the sewers.

"The great thing to notice, however, is that our house arrangements cut us off in every way from the sewer, so that none of the foul gases from it can find their way back to do us harm, although it is open and



DEFECTIVE DRAINS.

ready at all times to receive the excreta and other waste matters from the house.

"All that is necessary is to see that no solid matter of any kind is allowed to find its way into the gullies to choke them up, and this is effectually provided for by the grid which covers them."

"Do the drains themselves ever get out of order?" asked Uncle Sam.

"Oh yes," replied Mr. Hunter, "they may get out of order, but this rarely happens when the pipes have

been carefully laid in the first instance. If through careless workmanship or bad materials they have been joined in a slovenly way, then you can easily understand that sooner or later they will part asunder, and there will be a leakage into the soil around. All pipes are securely jointed with Portland cement; there is very little fear of any mishap with them—except I might add, in the event of a subsidence of the soil and that again is not very likely, situated as we are here. Otherwise, it does happen sometimes that the soil itself gives way round the pipes, and then having nothing to support them, they gradually sink down and become parted at one or more of the joints.

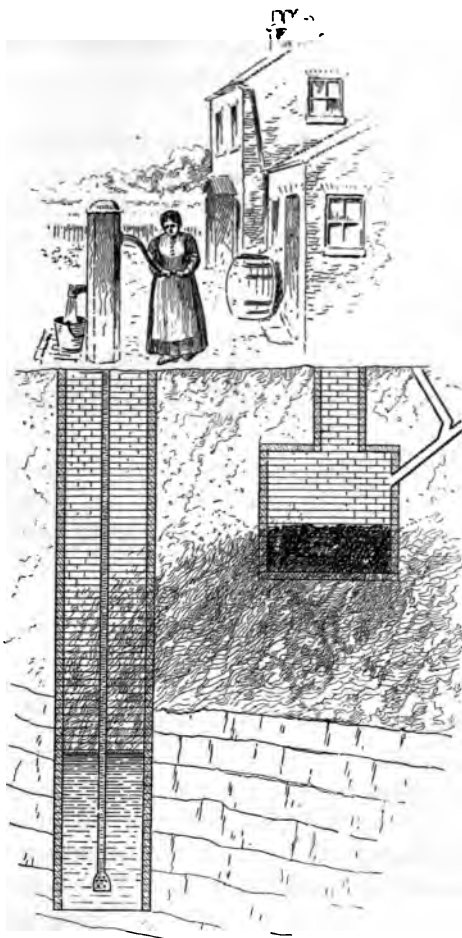
“If, from any cause whatever, the drain-pipes do become disconnected or broken, there is always a tell-tale, probably even before any offensive smell has been detected; and what do you think the tell-tale is? Don’t smile, for I am perfectly serious when I tell you that rats are the tell-tale to which I refer. I need not tell you that all sewers swarm with rats.

“The moment, therefore, rats begin to find their way into the house, it is time to have the drains of the house thoroughly examined, for without a doubt there is a defect in the pipes somewhere.

“Well, in spite of rats, and in spite of a possible break now and again in the drain-pipes,” said Uncle Sam, “I must say that I consider this the cleanest, quickest, simplest, and therefore the healthiest possible method of removing household waste and excreta before it has time to work mischief.

“In this, again, we in the country cannot compare with you. Our arrangements at home are on the *earth system*, and that is undoubtedly the best way

do, where an excellent water-flushing system, such as



CESSPOOL AND WELL.

us, is out of the question. Under this system a

quantity of dry earth is added to the excrement the closet is used. The dry earth acts as an odouriser, and so we are fairly free from bad smells, although of course we are a long way behind your perfect arrangements here.

“In some districts the pail system is used; even including even the ashes and house refuse—is removed daily in large pails. The



daily removal of all foul matter leaves the air wholesome, but it is not without its disadvantages.

“The worst possible system is the cesspool. Happily this is now fast disappearing even in country villages. It has been no uncommon thing to find the cesspool and the pump almost side by side in the same yard. In the days when they were constructed, out of sight meant out of mind, and people gave so little heed to those matters that the cesspool itself, instead of being made quite v

was loosely built of bricks, with the natural consequence that there was perpetual soakage in all directions through the ground, some of it, of course, finding its way into the well, from which the drinking-water was drawn. How can it be wondered at that typhoid, scarlet fever, and other terrible diseases frequently played havoc in such places?

"The fact is," said Mr. Hunter in conclusion, "this is a subject we have all taken a long time to learn. Why, in the early days of water-drainage, and that is not so very long ago, it was thought quite sufficient if the sewage was led into some neighbouring stream or river, for the running water to carry off. Out of sight, in this instance again, was out of mind. What did it matter about the towns and villages that drew their drinking-water from the same stream a few miles lower down?"

"The Rivers Pollution Act of 1876 has, however, put a stop to all this for the future, for no sewage may now be discharged into any stream except under the strictest supervision."

*Summary.*—When rats make their appearance in the house, be sure the drains are defective somewhere. They should be inspected at once. The water-flushing system, as carried out in towns, is the cleanest, simplest, and healthiest method of all. The worst possible system is the cesspool.

## THE NEED OF FRESH AIR

A week, after all, is a very short time, especially when each day, even before it comes, is mapped out, and each hour in it brings its round of engagements, and yet this is usually the case when our country cousins come up to pay us a visit in town.

*In the matter of sight-seeing these country folk*

always seem to have truly insatiable appetites. "We have only a week," they say; "let us make the most of it." And make the most of it they do; while the townspeople themselves, with these sights under their very noses year in and year out, prove the old saying that familiarity breeds contempt, for more often than not they pass them by unheeded.



Uncle Sam and Aunt Jane were no exceptions to the rule. During their week's stay with the Hunters they went everywhere, and saw everything that was worth seeing; and as they would not think of going anywhere without the "dear children," Norah and Bob had a grand week.

However, as all things come to an end sooner or later, so did this pleasant week; and at the end of it *uncle and aunt*, much against their wish, were com-

pelled to return home, as they could no longer be spared from the farm.

The two children, with tears in their eyes, watched the train as it steamed slowly out of the station, and they did not cease waving their handkerchiefs till it had quite disappeared from view. Then as they walked back home with father and mother, they could not help feeling a little sad at parting with those who had been so good to them during the past months.

The next day Mrs. Hunter had another visitor. It was Miss Brown, who had heard of the children's return, and was very anxious to see them, for Norah was a special favourite of hers.

Of course when the first greetings were over, Miss Brown could not help expressing her admiration of the new house. "What a lovely little house this is," she exclaimed. "You must all be very proud of it."

"Oh yes, we are very proud of it," said Mrs. Hunter. "Would you like to look over it?"

Miss Brown said that nothing would please her more, and so Mrs. Hunter led the way, and she and Norah followed from room to room. Norah, who had not forgotten her lessons at the classes, was very eager to point out to Miss Brown the ventilators in all the rooms, and to explain their working—father, of course, had told Norah herself all about them.

"Our rooms are never close and stuffy," she said. "The ventilators keep the air fresh at all times."

"Why should the air in a room get close and stuffy at all, Norah?" asked Miss Brown, as Mrs. Hunter left them, to go and prepare tea.

"It does so from two causes," replied Norah. "In the first place, burning of every sort loads the air with



carbonic acid gas, and so whatever we burn in rooms to give us light must poison the air with that bad gas. Then again, we ourselves poison the air with the same gas every time we breathe."

"Capital, dear," said Miss Brown. "I am so glad you have not forgotten everything during your illness and your holiday in the country."

"But you must remember that the poisoning effect of our breath does not end with the carbonic acid which we pour into the air. The lungs throw off, in addition to other impurities, minute solid particles of organic matter. These find their way into the air with our breath, and would be quite sufficient by themselves to poison the air around us, even if it were possible to get rid of all the carbonic acid gas."

"Indeed, the close, stuffy, fetid smell which we notice in a badly ventilated room is entirely due to these floating particles of decomposing organic matter. The carbonic acid, although poisonous, does not cause the bad smell; it is, as you know, an inodorous gas."

"There is one thing which has occurred to me," said Norah, "and it is this. We can all do a good deal to prevent illness by being clean in ourselves, but it does not matter how clean we are as far as breathing is concerned, we cannot help poisoning the air with our breath. Clean people must do this as well as dirty people."

"Yes, Norah, there is a good amount of truth in what you say," replied Miss Brown. "We can prevent our breath being dirty and poisonous, but *we cannot clean and purify the air around us, and so get rid of all that is bad*; and this is exactly the work that *ventilation* does for us."

"Think how disgusting it must be, to say the least of it, to sit in a close room, and breathe over and over again the very air which has already passed through the lungs of those who are sitting there with you.

"Let me make this quite clear. Imagine a person shut up for twenty-four hours in a room seven feet square and eight feet high. At the end of that time every particle of air in the room would have passed through her lungs; she would have robbed it of about one-twentieth of its oxygen, and breathed out into it an equal amount of carbonic acid gas, to say nothing of organic impurities.

"Such air would be quite unfit to breathe. But as long as she lives, she must continue to breathe; and thus at every breath she would be inhaling large quantities of these poison matters. We have only to picture to ourselves a number of people in that room instead of one, and think what the result would be.

"The very thought of it calls up in one's mind the hideous story of the Black Hole of Calcutta. On the 20th of June 1756, Surajah Dowlah, Nabob of Bengal, made a sudden and unexpected attack on the defenceless traders at Calcutta, or Fort William, as it was then more commonly called. After entering the town he took 146 British prisoners, and drove them, at the point of the sword, into a small room 18 feet long and 14 feet broad, where they were shut up for the night, the place being surrounded and strongly guarded by the Nabob's troops. There, through the sultry night of that hot climate, these poor sufferers endured unspeakable agonies of thirst and suffocation, trampling one another down in vain attempts to reach the one little window in the dungeon, filling the air with their

wild ravings of delirium and despair, the dusk outside meanwhile replying to their appeals with groans and curses. In the morning 23 out of the 24, and a woman, were dragged from this den of iniquity, alive, but pale, emaciated, exhausted, and unable to stand. The rest were a heap of corpses.

"Oh how horrible," said Norah. "Poor creatures! what their sufferings must have been," and she welled up in her eyes at the thought of it.

"Yes, dear," said Miss Brown, "and I don't doubt, whenever you look at these ventilators, the thought of those poor sufferers will flash across your mind. Now I want you to remember that, we are not all fortunate enough to live in a house of our own, with perfect ventilation provided; yet every one can use a few simple means to make the air in the house sweet and wholesome.

"To begin with, it is important to remember that we spend a good share of the twenty-four hours in bed-room, and that although we are sleeping, the process of respiration still goes on—it never ceases. It is essential for us to breathe the good fresh air even when we are awake. It is a good plan, except in the severest weather, to keep the top sash of the bed-room window down an inch or so day and

and the upper sash, through which air can enter in an upward direction, without any danger of a draught."

"I am afraid, Norah, you have already tired Miss Brown out with your ventilators," said her mother,



who had just come in to announce that tea was ready. "We will change the subject now, please," and they went to tea.

*Summary.*—In addition to carbonic acid gas the lungs give off little particles of organic matter, which decay and help to foul the air. We require fresh air to breathe, asleep and awake.

## WARMING ARRANGEMENTS—A CHAT

The evening turned out wet, raw, and chilly after tea, so Mrs. Hunter had a fire lighted in the sitting-room, and she and Miss Brown settled down for a cosy chat. They chatted pleasantly on various topics during the evening, the children every now and then keeping them amused with accounts of their doings in the country. Evidently they had had a good time of it at the farm.

During a lull in the conversation Miss Brown said, "I really cannot help admiring your pretty fire-places in all the rooms, Mrs. Hunter."

"Well," she replied, "I must admit I like them very much myself. Mr. Hunter, who has lived in America, and also in France and Germany, was rather inclined at first to persuade me to have closed stoves, because they are less trouble and more economical. They are used everywhere in all those countries; open fires, he says, are practically unknown. But somehow I think there is nothing like an open fire after all, and so, as he left me to decide, that settled it."

"I am sure you were quite right," said Miss Brown; "an open fire is much more healthy than a closed stove. I daresay you know that a closed stove has recently been substituted for open fires in the reading-room of the Public Library, and even in a large room like that the air sometimes feels stuffy and oppressive."

"Yes, with these stoves you miss the open chimney, and its constant upward draught, to ventilate the air of the room," replied Mrs. Hunter.

"Ah, but that is not their only disadvantage," said

Miss Brown. "They make the air of the room too dry, so that it is very difficult to breathe; and besides that, their heated iron surface frequently gives rise to an unpleasant smell by burning the particles of organic matter which come into contact with it, as they float about in the air. It is all these things combined which tend to make the air of a stove-heated room oppressive and stuffy."



A CLOSED STOVE.

"Then, too, unless the heat is carefully regulated, there is a danger of the iron itself getting red-hot, and in that condition it will allow the carbonic acid and other poison gases from the fire to pass through and load the air of the room.

"Those stoves have their own peculiar method of heating a room, which is altogether different from that of the open fire. They do it by heating the air itself. As the stove-plates get hot, they heat the air all round

them, and of course make it lighter than that which *is* further off. This colder, denser air presses the heated air on all sides, and forces it upward towards the ceiling, itself taking the place which that occupied all round the stove, but only to be heated in its turn, and forced upward as that was."

"I remember once seeing some boys amuse themselves at one of these stoves," said Norah, who had been listening to the conversation with evident interest. "I did not know what they were doing at the time, but I can see it all now. They held some little bits of loose, fluffy down over the stove, and watched them float up towards the ceiling. I wonder whether they knew why the down rose in the air like that?"

"Ah, Norah, I can see you understand it all," said Miss Brown. "The little bits of down were carried upward by the stream of heated air; and had you noticed you would have found the air very warm indeed, not only above the stove, but all round it.

"The chief advantage of these stoves is that by warming the air itself, and thus throwing it into circulation through the room, they tend to diffuse the heat more uniformly in all parts of it.

"Now," she added, addressing Norah, "if mother is not tired of all this, I should like to tell you how the open fire acts in warming the room."

"Oh please go on," said Mrs. Hunter. "Most of this is quite new to me; I enjoy it as much as she does, I assure you."

"Well then," Miss Brown continued, "when I say *that the open fire acts by radiation*, Norah, I am sure, *will at once know what I mean.*"

"Oh yes," cried Norah; "the fire sends out its

heat in straight lines, or rays, just as the sun shines upon us from the sky."

"Exactly," replied Miss Brown; "and we call this radiant heat, because it passes through the air in rays or straight lines. Now, as you have spoken about the sun's rays, I want you to follow me very carefully in what I am going to say. You may possibly have placed your hand on a wall when the sun has been shining on it. If you have, you know that it has felt quite warm—much warmer than the air round it. This is always the effect of radiant heat, because the heat-rays give up very little of their heat to the air itself as they pass through it; but the objects upon which they strike absorb the heat, and so actually become warmer than the air around them.

"Then why is the air so warm on a summer day?" asked Norah. "If the sun's rays do not warm it, something must."

"That is a very sensible question, Norah," said Miss Brown, "and the answer to it is a simple one. Very little of the heat which we feel in the air on a summer day comes directly from the sun's rays. The greater part of it, by far, is reflected by the objects round us, which have already absorbed those rays, and are busy giving them back to the air."

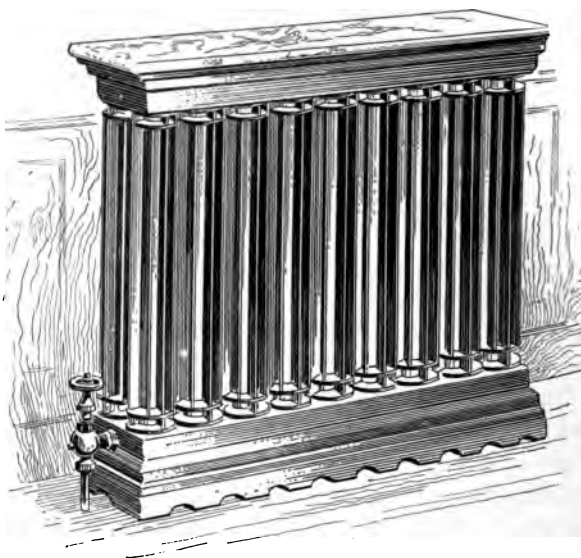
"This, I think," she continued, "will help you to form a clear idea of the way in which an open fire warms a room. The heat rays from it pass through the air without increasing its temperature to any great extent, and are absorbed by the furniture and other objects in the room, which in their turn give out again to the air the heat which they have received."

"In a room heated by a closed stove the walls, as



well as the furniture and other objects, not only although the air of the room itself is very warm, but this is also the case in a room which is heated by means of hot-water pipes or hot-air pipes, for they give off radiant heat from them."

"Oh, I wish you would explain those things to me."



HEATING BY HOT-WATER PIPES.

pipes to me, Miss Brown," said Norah. "I have often been puzzled about them."

"Well the working of them is very simple, Norah," replied Miss Brown, "for it is almost exactly the same as the hot-water arrangements in your own house. There is a self-filling boiler, just like yours, only much larger, and pipes from it lead all over the building and back again. The water is heated in the boiler

ried, hot as it is, through the whole circuit of  
es."

"Yes, but why does the water move along in the  
es?" asked Norah again.

"Why does the air rise upwards over the stove,  
rah?" asked Miss Brown in reply.

"Oh, the air becomes lighter as it gets hot, and  
efore it floats on the heavier air below it," said  
rah; and then she began to think, and Miss Brown  
sure she was on the right road.

All at once she cried, "Why it must be just the  
ae with the water in those pipes. As it is heated  
the boiler, it must get lighter than the cold water,  
t wants to come in, and so I suppose this colder  
ter is constantly pushing it onward up the pipes."

"Exactly," said Miss Brown. "I thought you  
uld find it out for yourself, Norah; and now you  
l easily understand the hot-air pipes too, for they  
in precisely the same way. I need not tell you  
t the hot water parts with its heat on its way  
ough the building, and by the time it returns to the  
ler it is cooler than that which is there, and so  
es it on, and the circulation is complete."

*Summary.*—Closed stoves warm a room by heating the air itself.  
n fires act by radiation. They send out rays of heat which warm  
objects all round, and these reflect the heat back into the air of  
room.

## MATERIALS USED IN WARMING AND LIGHTING

"Whilst we were discussing the various methods of  
ming the dwelling the other day, Norah, I came to  
conclusion *that* it would be a good thing to find  
opportunity for a chat about the materials used

both for warming and lighting purposes," said Miss Brown. "That was my chief reason for asking you to come to tea with me this afternoon. I am glad you have come, dear, for after tea I have not only something to talk about, but something to show you, which I know will interest you very much."

Of course Norah thanked her kind friend again and again, but, as nothing more was said about it after that, her girlish curiosity kept her mind busy all through tea-time, wondering what it could be that Miss Brown had to show her. Her thoughts were intent on the matter, indeed, that she was really glad when tea was over, and she wanted no second invitation when her friend said, "Now, dear, are you ready?"

"Our chat this evening is to be about the materials used in warming and lighting our dwellings; and to begin with, I need scarcely remind you that we in England depend almost entirely upon coal and coke for our household fires. In some countries, where coke is not so plentiful as it is here, the people use peat, charcoal, wood, and even oil for this purpose.

"Coal is too closely associated with our everyday life to need any special description. Your lessons in school have told you that it has been formed from the remains of immense forests, buried ages ago in the earth, and that it is dug out of mines in many parts of the country.

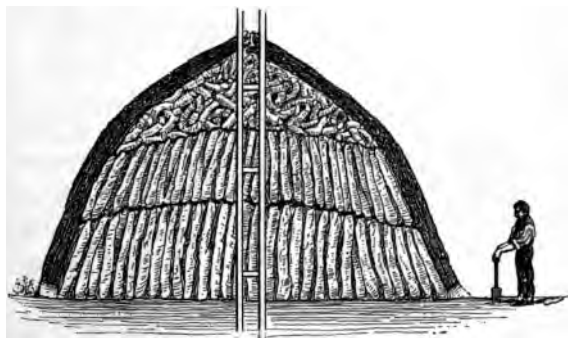
"You are not so familiar with peat, but in many parts of Ireland it is as generally used as coal is with us. The people in the Isle of Man, too, and also in some parts of Scotland depend upon peat for their fuel. It is simply decayed vegetable matter—a sort of surface coal in fact. The districts where it is found were once covered with dense forests. These, in "

course of ages, have been cut down, or burnt down, and it is the roots of the trees themselves, left in the ground to decay, that have made this fuel substance."

"Is this what the Irish people call bog-land?" asked Norah.

"Yes, dear," replied Miss Brown. "The Irish pare off the top of the bogs and dry it in the sun, and this substance is the peat which makes their fuel."

"In many parts of the Continent, although there is no coal, there is abundance of timber, and con-



sequently the people have to depend upon this for their fuel; but they do not use it in the form of wood. They convert it into charcoal.

"The charcoal is easily prepared. They have only to make a great pile of wood, cover it close with turf to shut out the air, and then set fire to it. The wood, closed in from the action of the air, does not burn away, but only becomes charred, or, in other words, *changed into charcoal.*"

"Why, that must be exactly the same sort of thing

as you did, when you once made some charcoal in a piece of hot gas-pipe," said Norah.

"Yes, Norah, you are quite right; it is exactly the same process," said Miss Brown. "I may add," she continued, "that charcoal makes a bright, red, smoke-



less fire. You have doubtless seen it burning in the stoves of the people who sell roasted chestnuts in the streets. I must also tell you that it is very dangerous to burn charcoal in a room. Charcoal is, as you *know*, only another name for carbon, and when carbon *burns*, it forms the poisonous gas—carbonic acid. *Many people have been found dead in their rooms*

through burning charcoal fires without providing an outlet for the escape of the carbonic acid gas, which is the product of the burning. And now, I think, you would like to see the little experiment which I have to show you."

She proceeded to place a number of strange things on the table, and amongst them a long clay pipe such as Norah had sometimes seen her father smoke. This Norah eyed with a face so full of astonishment, that Miss Brown said, with a hearty laugh, "Oh, don't be afraid, dear, I am not going to smoke the pipe. Look, the bowl is stopped up with clay; I did that this morning, so that it might be ready for us now. But what do you think I have inside the bowl? Of course you don't know, so I will tell you; it is filled with finely powdered coal."

She then fixed the bowl of the pipe in the middle of the red part of the fire, and turned the stem of it, so as to make the end dip into a bowl of water. This done, she filled a small test-tube with water, and inverted it in the basin, with the mouth of the tube below the surface of the water, and just over the end of the pipe-stem.

Presently, as the bowl of the pipe got red-hot, a number of bubbles began to run up the test-tube one after another, and as they went up, the water began to flow out of the tube into the basin, and continued to do so, till it was all gone.

"Now, Norah," she said when it was all over, "we have got something in the tube in place of the water. Let us see what it is," and she took the tube out of the water, covering up the mouth of it with her hand, as she spoke. She next removed her hand

and put a light to the mouth of the tube, the gas—for of course it was a gas—too

“Now, dear,” she continued, “do you have been doing? I have been making powdered coal in the bowl of the pipe—call it, and it is the very gas which we houses. See how easily it burns,” she said as she spoke she moved the stem of the water, and applied a match to it causing the gas to take fire instantly, and a little jet of flame.

It would take too long to describe Norah's delight at what she had seen; but she was more surprised to learn that all the gas was made in precisely the same way. Instead of a bowl with its pinch of coal-dust, they have gas-factories large strongly-built closed chambers or retorts, made of fire-brick and iron; instead of a stem they have long iron pipes; and instead of a little glass tube they have enormous iron pipes which may be seen towering above the town. Nevertheless she learned from the little that the gas, which is so useful to us for heating and lighting purposes, is really coal-gas, made in much the same way as she had made it in the clay pipe.

“Now,” said Miss Brown, “we have broken the pipe, so I will break it up,” and as she said she struck the bowl of it a blow, which broke it.

“I thought you said you put coal in the pipe,” said Norah. “This looks more like coke than coal.”

“Yes, dear, I know it does,” said Miss Brown. “*It is coke*; and all the coke which we

uses is nothing but the remains of the coal, after the gas has been taken out of it in those great retorts.

"I intended," she said in conclusion, "to say a few words to you about some of the materials we use for lighting purposes besides gas; but I think we had better save that up for another occasion."

*Summary.*—Coal and peat are similar in their origin. They are both the remains of bygone vegetation. Peat is a sort of surface coal. In some countries, where timber is abundant, charcoal is used for fuel. Charcoal is very dangerous, as it gives off carbonic acid gas while burning.

## GAS

"I want you to come and see me this evening, Norah, for another chat," said Miss Brown as they walked along homewards after school; and, accordingly, at the tick of the clock, Norah was knocking at Miss Brown's door.

"It occurred to me after our last conversation, dear," began Miss Brown, as soon as they were seated, "that as gas is so much used now you ought to know something of its usefulness, and also the best way of managing it, so as to keep clear of danger; for you must never forget that, useful as gas is, it is also highly dangerous in careless hands. That was my reason for wanting another chat.

"When gas first came into use it was employed exclusively for lighting purposes, but you know that it is now also very largely used, instead of coal, for heating and cooking as well as lighting.

"Let us examine the flame which comes from the gas-burner. You observe that it gives a bright, white light; but notice what happens when I hold this white plate over it. The plate soon gets blackened in the



flame; and I may remind you that our ceilings in like manner get blackened where gas is burnt."

"I suppose it is the smoke from the gas which does that," said Norah.

"Yes, but what do you think this smoke is?" asked Miss Brown. "Well, I don't expect you to answer that question," she added, "so I will tell you. The smoke from the gas consists of tiny particles of carbon, which have not been burnt up.

"The gas came, you know, from coal, and coal is the remains of trees and other vegetation that once grew on the earth. When you remember that carbon is the chief basis of all vegetation, you will no longer be surprised to find that it is one of the chief constituents of coal, and of the gas made from coal.

"As the coal was roasted in the retorts in the gas-works, it gave up some of its carbon together with its other constituents to form the new substance—coal-gas. That which remained behind in the retorts after the gas had all passed away was coke, and this substance is nearly pure carbon.

"It is the gas, however, which we are more particularly concerned with now, not the coke; but I want you to remember that the smoke and soot which rise from a coal fire, as well as the smoke from the coal gas, consist of particles of unburnt carbon."

"What a pity it is that gas makes everything so black," said Norah.

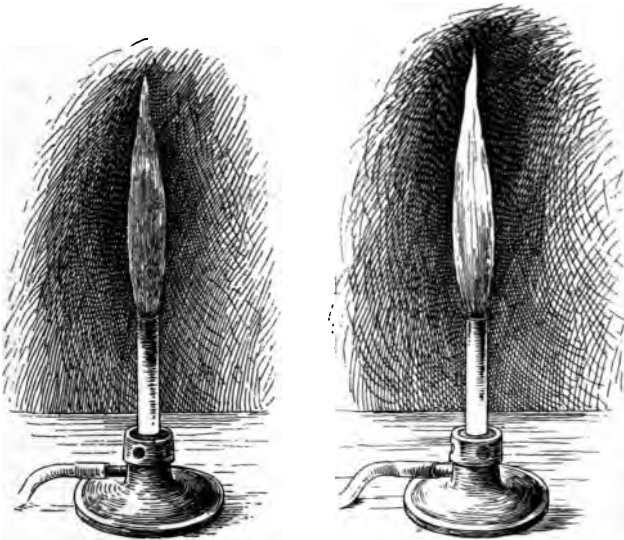
"Well, dear, it is to a certain extent," replied Miss Brown; "but without that unburnt carbon in the flame, the gas would have no bright illuminating power."

"How very strange," cried Norah.

"The fact is, all that white light which we see in

the flame is entirely due to the tiny particles of carbon, which the flame is not powerful enough to burn away, but is just able to raise to a white heat. These tiny particles of heated carbon floating about in the flame are the cause of all its brilliant light."

She next proceeded to light the gas at the Bunsen-burner, which she had placed on the table in readiness,



and as it burst into flame she said, "This, you see, is not a brilliant white light, but a dull bluish flame."

Then she added, after holding the plate in the flame for a short time as she had done before, "This flame leaves no black mark on the plate as the other did. In other words, this flame does not smoke—there is no unburnt carbon floating about in it. Now let us see what all this means.

"We shall understand it best by examining the Bunsen-burner itself. Here it stands on the table with a piece of india-rubber tubing to connect it with the ordinary gas-burner of the room, and, of course, supply it with gas. At first you would not notice, in all probability, any difference between it and other gas-burners, except that it is made to stand on the table. But look at these round holes in the stem; they make all the difference. When the gas is turned on and burns at the top of the burner, the heat creates a draught and draws in air through these holes, so that the gas and air mingle together as they rush up the tube. The air, you know, contains oxygen, and it is this extra supply of oxygen which makes the flame burn so much more fiercely that all the carbon is consumed. There is no unburnt carbon, and therefore no smoke, in the flame of a Bunsen-burner, for the simple reason that it is all consumed."

All of a sudden, and without saying a word, she gave the stem of the Bunsen-burner a turn, so as to close up the holes, and instantly the dull blue flame gave place to a bright white light like that of an ordinary burner. This seemed at first like magic to Norah, till Miss Brown explained what she had done, and brought back the blue flame once more with another turn of the burner. Then she understood it better than before.

"I have been at some trouble to explain all this, Norah," added Miss Brown, "because we use both kinds of burner in our houses. For lighting purposes we use the ordinary burner, because we want the light which comes from the unburnt carbon. But in our gas-stoves, whether for warming or cooking, the principle of the

Bunsen-burner is employed, and air is allowed to enter and mingle with the gas to ensure complete combustion, great heat, and no smoke. In all these the flame is a dull, bluish one, without any bright light whatever."

"Oh, thank you, Miss Brown," exclaimed Norah. "I am so pleased you have explained this to me, for I have often been puzzled to see two kinds of flame from gas. I am sure I shall never forget this now."

"I am glad you have been interested in what I have said, dear," replied Miss Brown; "and now, if you are not tired, I should like to pass on to consider the dangerous nature of gas—its explosiveness. This will follow quite naturally now."

"Oh please go on, I am not at all tired," said Norah eagerly.

"Well then," said Miss Brown, "let us think once more of the Bunsen-burner. A certain quantity of air is allowed to enter through those holes in it and mingle with the gas, and this makes the flame burn with an intense heat. But if more than that amount of air were allowed to enter, or the air and gas were mixed in greater quantities, the result would not be merely a fiercer flame, but a violent explosion, for gas mixed with air is of a terribly explosive nature.

"It is in the highest degree important, that every one should know this in order to be on their guard against possible danger, but let me assure you that there is no danger whatever when proper care is taken.

"Mother has a new gas-stove for cooking purposes, I see. Never go near it with a light, without first ascertaining that there is no escape of the gas. Your nose will soon tell you if there is one. It has sometimes happened that a tap has been carelessly left

turned on, so that the oven itself has got full of gas ; and then some one has opened the door, and, without noticing the smell, proceeded to light the jets. Poor girl ! what a terrible death ! and only for the want of a little care and thought.

- Remember, you are never to go near the stove with a lighted match if there is the least smell of gas. You are never in any case, smell or no smell, to open the stove door with a lighted match in your hand. When the door is opened and there is no smell of gas, light the match, put it to the jet, and turn on the tap, and then all will be right, but do not turn on the tap first, and afterwards prepare to get a light.

- In the same way, never take a light into a room if you can smell gas. You are quite safe without a light. No matter how much gas has escaped, there can be no explosion. Go in, open doors and windows, and the gas will soon pass away out of the room into the open air, and fresh air will take its place. Then, and not till then, will it be safe to get a light and find out where the gas is escaping."

When Norah left her kind friend, she felt she had learned much that was exceedingly valuable.

*Summary.*—Gas is used for both warming and lighting purposes. When it is burned in a stove for warming or cooking, air is allowed to mingle with it, so as to ensure complete combustion.

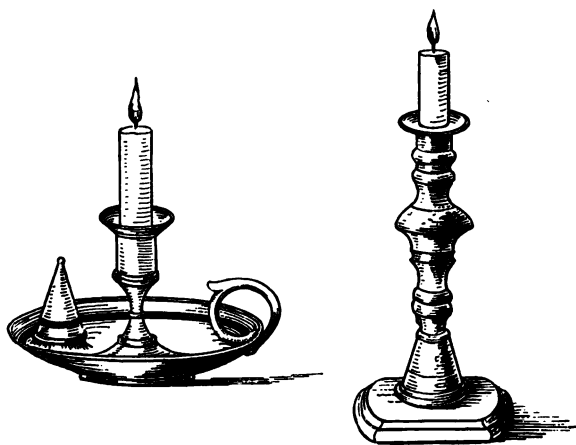
### OIL, LAMPS, AND CANDLES

Norah was burning with impatience to tell her mother all the new and interesting things she had learned from her evenings with Miss Brown ; but somehow Mrs. Hunter was so busy with her household

duties that it was several days before she could find a chance for a quiet talk.

When at length the long-wished-for opportunity came, she was not at all sorry that she had waited so long, for she found she had two for her audience instead of one, as father himself had a leisure evening too. They both listened very attentively to her account, and were surprised and delighted to find how closely she had followed the subject, and how well she had stored the facts in her mind—especially those connected with the nature and characteristics of gas.

"Yes," said Mr. Hunter, when she had finished, "we have made immense strides in our lighting

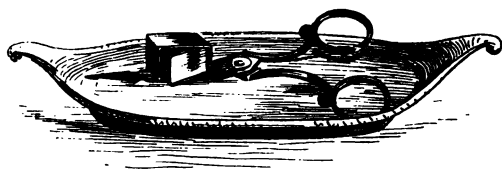


arrangements since my boyhood days, and I expect to see greater strides still, as Electric Lighting pushes its way to the front. There is little doubt that this will be the light of the future, although it is at present too costly for general use. Leaving out its superiority, as

a more brilliant light, it has the additional advantage of not fouling the air as gas does.

"But after all," he added, as he looked round, "our splendid ventilation arrangements here enable us to get rid of the carbonic acid gas and other foul products from the gas-burners; for the bad, heated air is sure to rise to the ceiling, and then it can easily find its way out through the vent holes provided for it."

"I often picture to myself what it must have been to sit in a room at night, and try to read by the light of a tallow candle—or worse still—one of the old rush candles," said Mrs. Hunter. "Every now and then, to add to the discomfort, it was necessary to get up and snuff the candle, to prevent the wick from leaning on one side, and so causing it to waste; and even after all, the least draught from an open door or window would be sufficient to make the candle gutter and burn away all down one side. Of course very few people use candles for ordinary lighting purposes now, but when I was a girl, the candlesticks and



snuffers were very necessary articles in every household."

"Yes, and when oil lamps first came into common use," said Mr. Hunter, "they must have been as great an advance on tallow candles as gas now is on the lamps themselves."

"Especially when it was found that the lamps were

much cheaper than candles," rejoined Mrs. Hunter, so always had an eye to economy in house-keeping. Why I myself can remember the time when ordinary tallow candles cost eightpence a pound, and the better kind, known as sperm candles, which were generally in use on high days and holidays, were not to be had for less than a shilling a pound.

"It was no wonder, when paraffin and petroleum came into use for burning in lamps, with their superior lighting power and smaller cost, that they soon put tallow candles in the shade. I have heard my mother say, when I was a girl, that it would cost as much to burn a good candle for an hour, as it did to keep a lamp burning two whole nights, and now gas costs even less than lamps—always provided it is carefully looked after, and not wasted," she added.

"In those days," said Mr. Hunter, "people who could afford it burned colza-oil in their lamps, because they disliked the smell of paraffin. This colza-oil is made from the seeds of a kind of cabbage, which is grown in France and Belgium, but being much more expensive than paraffin, it did not come within the reach of all."

"I have often wondered what paraffin-oil is, father," said Norah. "It does not seem like oil to me. Will you tell me what it is, please?"

"Well, it is not like ordinary oils, I must confess, dear," said Mr. Hunter. "It is a mineral oil, very similar to the naphtha which the street vendors burn on their stalls; and like it, is one of the off-products of coal.

"There are many varieties of this oil—all of them known by the one common name of paraffin. Some are manufactured, but most of them are got direct from the ground. Petroleum, or rock-oil, is the commonest



of these. It is obtained from springs in many parts of the world—but chiefly in America and Russia.

“The petroleum, as it comes from the earth, is a dirty, greenish-yellow liquid, very thick and oily, and in this state it is quite unfit for use. It has to be sent to the refining factories to be purified. By this process the coarse oil is separated into a variety of different substances. There is first of all the clear liquid commonly known as paraffin-oil, for burning in lamps. Then, besides this, there is a beautiful, fine



white substance like wax, which is called solid paraffin, and is now used instead of tallow for making candles. The refined petroleum or rock-oil is properly known as kerosene.

“But remember, dear, paraffin, of whatever sort it is, all comes from coal-beds deep in the earth, or from the shale which is associated with the coal.”

“What wonderful things there are all round us, if we will only take the trouble to look for them,” said Norah. “I should never have thought that paraffin, and especially those white, waxy-looking

candles, had any connection with coal.

“I think if I explain how paraffin-oil burns in a

lamp," said her father, "you will see that there is at least some connection between it and the gas that comes from coal.

"The lamp, you know, is always provided with a wick, and this being porous sucks up or absorbs the oil from the reservoir. The heat of the flame then evaporates this oil in the wick, and it is the vapour or gas from it, and not the oil itself, that burns, just as the coal-gas burns in our gas-burners.

"It is necessary to always keep paraffin oil in a cool place, because if it is allowed to get warm, it at once begins to give off this gas, and then it is very dangerous, for the gas or vapour from paraffin (like ordinary coal-gas) is very explosive when it mixes with air.

"The oil itself will not burn so long as it is kept cool. Wait a moment and I will prove this to you."

He went away and returned almost at once with some paraffin oil in a saucer, which he had brought up from the cool cellar. He showed, by thrusting a burning match into it, that the oil itself would not take fire, but actually put out the match.

"I have another liquid in this bottle," he said as soon as Norah had got over her surprise. "Let us see what we can learn about that."

He poured a little into a saucer, and put a light to it, and it instantly blazed up with a slight bang.

"This," he said, "is benzoline, a liquid distilled from naphtha. It is much more dangerous than paraffin, because it constantly evaporates even with the heat of an ordinary warm day."

"Now I think, dear," said Mrs. Hunter, "after what

father has shown you, it will be easy to see that the greatest care is necessary in trimming the lamps for use. They should always be trimmed in the day-time, for, if they are left till the evening, and trimmed in a warm room, there is great danger of an explosion. Most of the accidents that occur are the result of carelessness in some way.

"The trimming consists of filling the reservoir with oil, and cleaning the charred portion of the wick. The best way to do this is to pinch it off with a piece of soft paper; this is better than using scissors to cut it, because it is difficult to cut it quite straight. The glass chimney, of course, must be cleaned too, and polished with a soft rag, and above all every part of the outer surface of the lamp must be carefully wiped and rubbed up, to remove any spots of oil that may have dropped on it, or it will smell very badly when it is lighted.

"Hanging lamps are by far the safest and best, especially in a home where there are children, for there is less chance of their getting upset."

*Summary.*—Mineral oils, such as paraffin and petroleum, are obtained from mineral springs in the earth. They all come from beds of coal and shale. Paraffin should be kept in a cool place, as it evaporates in a warm temperature, and the vapour is very explosive if it mixes with air.

### FIRE! FIRE! FIRE!

A very terrible and heart-rending accident had occurred in the neighbourhood; the story of it was on every tongue; the very thought of it blanched every

cheek. A poor girl, Katie Wilson, had been burned to death under the most distressing circumstances. No one knew how the awful thing happened. The



or terrified girl was seen by some passers-by to rush out of the house into the street enveloped in flames, and she died after suffering the most unspeakable agonies. Poor child !

*Norah and the rest of the girls had been discussing*

the sad calamity, their eyes brimming over with tears all the while; but they were taken somewhat by surprise when Miss Brown, during the morning, said: "Girls, I know what is uppermost in your minds to-day, and I think, for all your sakes, I must now make poor little Katie's sad end the reason for a special lesson. I want to talk to you about fire. Fire, somebody has said, is a good servant but a bad master. You see what a terrible master fire has been in this case. I want to show you how you can master the fire, so that in the event of anything of this kind happening, you will know exactly what to do, and so be able to save yourselves from the fearful tortures and cruel death which overtook our dear little friend.

"Let us begin by learning something about the nature of our clothing. A few little experiments will make this part of our subject quite clear. I have here on the table a variety of different articles, arranged in two heaps. I want to show you how these things behave when they are brought into contact with a flame."

As she spoke she took from one heap a handful of ordinary sheep's wool, and, with the help of a small pair of hand-tongs, held a piece of it in the flame of the spirit lamp. It took fire, but it only frizzled, and spluttered, and burned slowly. Then she did the same with some cotton-wool taken from the other heap, but this blazed up at once into a strong flame, and burned away very rapidly.

She next submitted to the flame, in the same way, a *thin strip* of leather from one heap, and some *raw flax* from the other. The leather, like the wool

frizzled slowly, but the flax blazed away and was gone in an instant.

Lastly, a piece of whalebone and a few feathers from the one heap were tried, side by side with a thin strip of wood and a sheet of paper from the other, and here again the result was the same. The whalebone and feathers, like the wool and leather, only frizzled in the flame, while the other things blazed up fiercely.

"Now think for a moment, girls," she said, when she had carefully extinguished the fire, "and tell me what kind of substances all these things are—wool, leather, whalebone, and feathers."

"They are all *animal substances*," cried several of the girls in a moment.

"Quite right; and now look at the other heap. What have you to say about such things as cotton-wool, flax, wood, and paper?"

"These are all *vegetable substances*," they at once replied.

"Quite right again. Now I want you to remember what you have seen this morning, for it will be useful. The vegetable substance, in each case, took fire much more readily, and burned much more fiercely, than the animal substance.

"You know, of course, that wool, cotton, and flax supply us with the chief materials for our clothing. Wool provides cloth, flannel, serge, and an immense variety of worsted goods; flax is made into all sorts of linen fabrics; and cotton yields an almost endless variety of useful materials, chief among them being calico, print, muslin, flannelette, and such like.

"If we hold these materials in the flame, they will

doubtless act very much in the same way as the substances from which they are made. Let us see."

She first submitted the various cotton and linen fabrics to the flame, one by one, and as she did so, each blazed up fiercely—the cotton even more fiercely than the linen materials.

She afterwards tried the pieces of cloth, flannel, serge, and other woollen materials. These one and all took fire more slowly, and burned with some difficulty, frizzling in the flame, just as the piece of raw wool had done.

"Can you think of any other animal substance besides wool, which provides material for clothing?" she asked.

"Silk is an animal substance," said Norah; "it is made by the silk-worm."

"Quite right, Norah; now let us see how this other animal substance—silk—acts in the fire."

So saying, she held a piece of silk in the flame, and pointed out that, although it burned, it was only with the same kind of slow frizzling, as they had seen when the wool was burned.

"You see, girls," she continued, "by knowing the nature of the different materials of which our clothing is made, we are enabled to be on our guard against fire; and on the principle of the old saying that '*prevention is better than cure*,' I want to make that our first point, in dealing with this important subject.

"It is easier by far to avoid the danger of fire altogether by using proper precaution, than to try to put the fire out when once it has caught your dress. You would be comparatively safe in your serge frock, even if it accidentally came in contact with the fire

because it is slow to ignite; but if your pinafore, or apron, or any other cotton garment were flicked across the bars it would probably catch fire in an instant, and blaze up with fearful rapidity, till it enveloped you in a sheet of flame.

“Woollen and silk materials will smoulder quietly, although they do not readily blaze. A spark or a red-hot cinder from the fire, falling on the hearth-rug, for instance, would probably cause it to smoulder, and it might smoulder for a long time. While this smouldering was going on, however, there would be an unmistakable smell of burning, to give timely warning to those who were in the house. The danger is when there is no one about, and the fire has time to smoulder on, till it reaches some material more inflammable than the woollen rug. Then, of course, it spreads at a fearful rate, and works havoc all round.”

*Summary.*—Be careful, both in your home duties and also in your play, to keep your print or muslin dress, your pinafore and apron away from the fire or any naked flame. Be careful to keep all lights away from the lace and muslin window curtains. Be careful never to throw lighted matches down anywhere. If they fell on a woollen rug they might cause it to smoulder for a long time, and at last, perhaps hours after, the fire would spread to other articles in the room. If they fell among the lace window curtains, there would instantly be a sudden blaze, which would rapidly attack everything within reach.

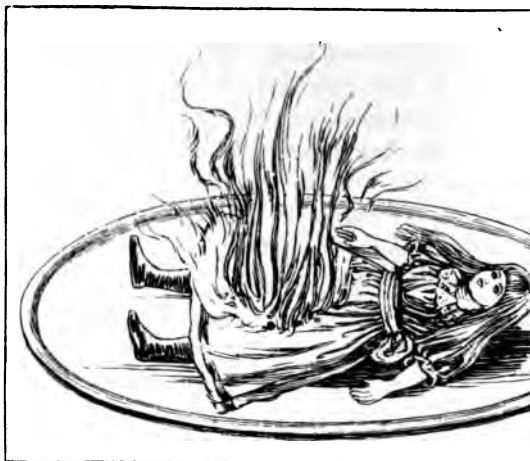
## HOW TO ACT IF THE DRESS CATCHES FIRE

“In our last conversation,” began Miss Brown, “I tried to impress upon you the necessity of taking every precaution to avoid accident by fire. Still, in spite of precautions, accidents may at any time happen, and *efore we leave this subject, I want to fully prepare*



you to meet such an emergency, should it occur to yourself or any one near you."

When she had finished speaking, she produced a couple of big wooden dolls, which had been dressed for the occasion. These she stood upon large iron trays in the middle of the room, and after calling upon the girls to watch carefully



happened, she proceeded to set a match to the other one.

Both dresses at once took fire, but she knocked over one of the dolls with her pointed toe, and lay it in a horizontal position on the tray. The other she allowed to burn, as it stood, for quite half an hour, and all this time the girls could see the flames up, and enveloping the head, neck, and arms as well as the body of the doll.

*It was badly burned all over before she*

it down, and proceeded to put out the flames; but by this time the first doll had ceased to blaze—there was only a slight smouldering in the skirts of its clothes.

As soon as the fire was all extinguished, and the



dolls were fit to handle, she said: "Now, girls, let us examine our poor dolls, and find out the extent of the mischief. Both caught fire, and both would have been equally injured if they had been allowed to stand there.

"Suppose we look first at the one I knocked over. She, *you see*, is not much hurt, except that the skirt of the dress is burnt. *Flames rise*: never forget that.

As she lay in the horizontal position, the flames from the burning dress leaped up into the air for a time but they had nothing to feed upon, and they soon died down, so that the head, neck, arms, and body of the doll remained almost untouched by the fire.

"Now turn to the other poor thing. See, every particle of clothing on it is burned away, and all the time the clothing was burning, the doll itself was being burned and scorched. She is burned from head to foot.

"Flames, as we said just now, always rise; they mount upwards with fearful rapidity, and as this poor doll stood in the upright position all the time, she was enveloped in a sheet of flame. Poor Katie Wilson, think of her, for this was just her case. The flames leaped up round her on every side.

"Now let us come to something practical, for of course you will readily understand we have not burned our dolls without a good purpose.

"Should you at any time be unfortunate enough to set your dress on fire, remember, your first act must be to *throw yourself flat on the floor*, and keep in that horizontal position. Never run about and scream for help as poor Katie did. Help yourself till other help comes.

"While you are in the horizontal position, the flames will rise, but only into the air; they will not be able to reach your head, face, neck, and body.

"*If you can manage to roll over and over on the floor*, still keeping in the same horizontal posture, so much the better, it will help to extinguish the flames.

"*If you can manage to get hold of the hearth-rug*

*table-cover, or some other thick woollen article and yourself up in it, you will have an even better chance still of putting out the fire.*

*'Should there be a bell-pull within reach in the room, so that you may clutch at it as you lie on the floor, use it with all your vigour. If not, endeavour to crawl to the door, throw it open, and call loudly for help. While you are lying prone on the ground, the draught from the open door will assist you rather than otherwise, for it will blow the flames away from*

*'Remember once more, the very worst—the most dangerous step is to rush out of the room, for the draught of air would feed the flames, and you would instantly be enveloped in them from head to foot.*

*'Lastly, it must be borne in mind that we have to consider merely our own safety to consider. We may at any moment be called upon to help some unfortunate person whose dress has caught fire.*

*'Should such an emergency arise, it is absolutely necessary that we should know how to act without losing our self-command, for the slightest delay in case of fire may be fatal.*

*'First and foremost, then, throw the person, who is on fire, on the floor, and keep her there while you stifle the flames with hearth-rug, table-cover, coats, or whatever thick woollen articles may be within reach.*

*'A girl or a woman, in rushing to help another in this way, must be careful not to allow her own skirts to come near the fire. The greatest danger of this is to be in getting the poor sufferer to lie down, for she will be got down on the floor at any risk if you wish*

to save her. After this, the best plan is to approach her from behind the head, as she lies, and throw the thick article or articles over the lower part of the neck. This little precaution will prevent your own dress catching, and the rest will be easy.

"You will probably burn your own hands unless during the rescue, but remember they will be glorious scars if you have saved the life of a fellow-creature, and spared her the awful torture of poor Katie Wilson. Think of your own little brothers and sisters at home. What would you not save them from such a fearful death!"

### HOME, SWEET HOME

"Mother," said Norah one morning, "the old 'Home, sweet Home' has lately been running in my head more than ever. It seems to be uppermost in my mind a hundred times a day, for mine is indeed a sweet Home.

"Let me see," she added, as she slid her arm round her mother's waist, "I have first of all a sweet darling mother and a dear good father, and that ought to be enough to make any girl say, 'There's no place like home.' It is the word 'sweet' that seems to ring in my ears, now that I am getting older and can understand things better.

"It's mother, after all, that makes my home sweet, in more ways than one," and she nestled closer as she spoke. "You make it sweet, dear, now with love and gentleness, but in keeping everything *clean and wholesome*.

"Oh, mother," she went on, "I do want so

p you in your household duties. I don't mean in  
le things such as I have always done. I want you  
nake me responsible for some of the work of the  
se, so that it may relieve you a little. I shall be  
leased to feel that you can trust me to do some-  
ng all by myself—and then, too, how proud father  
l be. See, I am getting quite a woman now—I  
almost as tall as you.”

“Well, dear,” replied her mother, “I have no doubt  
veet’ in the words of the song means ‘happy.’ The  
veet home’ is a ‘happy home,’ but I have never yet  
en able to understand how any home could be a  
ppy one, which was not sweet in the other sense—  
at is, in the sense of being clean and wholesome, as  
u say.

“I could look with more confidence for a happy  
me in the tiniest cottage, where everything is kept  
otlessly clean, than I could in a richly furnished  
use, where bad management allows dust and dirt to  
cumulate, and where perhaps the chief use of the  
ostly draperies is to hide up dirty corners—where,  
t short, the mistress leaves everything to careless  
rvants. Not that I mean to say,” she added quickly,  
that all servants are careless. It is more often  
an not that a careless mistress makes a careless  
aid.”

“But, mother dear,” said Norah, “you have no  
rvant in our little house, and although you never  
em to be in a muddle or a hurry-scurry with  
our house-work as some people are, I am sure you  
ust work very hard to keep everything as nice as  
is.”

“Ah, Norah,” replied her mother, “that after all is

the great secret for a girl to learn if she wishes to make a good housewife. Her work requires to be planned out with as much care and forethought as any other work. She will never be a success unless she put a system into it. It would vex and pain me to have my home frequently in a great muddle from top to bottom when father comes home tired and weary from his work. No matter what may be going on, there is always a cosy place for him, and as a rule I try to get all the house-work over before he comes home.

"I never clean a dirty room, for the simple reason that, by good management, I have no dirty rooms to clean. I often smile when I hear women talk about having a good clean up, and I think to myself what needless labour they make through their bad management. After their 'good clean up' everything is left for days and perhaps weeks with a lick and a promise, as my dear mother used to say, and the dust and dirt are allowed to accumulate again, especially in the sly corners till the next turn-out comes."

"The place must be getting worse and worse every day," said Norah. "No wonder they want 'a good clean up,' as they call it, at last. I suppose that when it is so dirty that they are ashamed of it."

"I expect it is a case of *out of sight, out of mind*," replied her mother. "They certainly cannot know that if the dirt is in the room at all, even in the out-of-the-way corners, it will be sure to find its way in the air of the room. Neither can they know that dirt of every kind brings bad smells which pollute the air."

"One would think their own noses ought to tell them that," said Norah.

"It is quite possible that they do not notice any bad smell, as they are always in it," said her mother; for it is a well-known fact that our smelling nerves become in time so accustomed to a particular smell, that they do not heed it. But remember it is there all the same, with its full power for mischief, whether they notice it or not. A stranger going into the room would detect the close, fusty smell in an instant.

"I am sure, from what you have seen of our home arrangements, dear," she added, "you will not mistake my meaning in all this. I am not saying one word against having regular cleaning days; every good housewife does this. You know that just as I have a regular day for washing, and another for starching, mending, and mending, so I arrange the work of the house, giving each portion to its own particular day—dining-rooms one day, sitting-rooms another, kitchen and parlory another, and so on.

"But it must be remembered that there are daily as well as weekly duties in a household, and these must not be left. The beds, for instance, must be made, and the bedroom slops removed every day; and the dining-rooms, and, indeed, all the rooms, must be dusted and made tidy. The staircase, too, must be dusted, the passage mats taken up and shaken, the passage itself swept, and the doorstep cleaned. Then again every good housewife takes a pride in her fire-places. The grates are polished every day; it is so much easier work than it would be if they were left for a week."

"That makes a good deal to do in the course of the day, mother, doesn't it?" said Norah; "and even then you have *not mentioned* the washing up of plates and knives, cups and saucers, and glasses used in the daily



meals, nor the cleaning of knives, forks, and spoons, as well as the pots and pans and other kitchen things used in cooking and preparing the food. I am sure it is time I took some of these things off your hands, mother, and I shall be so glad to try my best."

"Very well, dear, we will talk it over and see what you can do," said her mother, with a smile.

*Summary.*—Never allow dirt and dust to accumulate in sly corners, for although the dirt may be out of sight, it pollutes the air all round, and will give the room a close, fusty smell.

### NORAH'S BEDROOM

"Now, Norah dear," said Mrs. Hunter the same afternoon, "I have been thinking over our last conversation, and have come to the conclusion that it will be quite possible for you to relieve me by taking sole charge of your own bedroom. From to-day, therefore, you yourself shall attend to everything in that room. I shall not interfere, except that I reserve to myself the right of looking in from time to time to see what the room is like. I will be inspector, in fact," she added, with one of her pleasant smiles, "and visit you occasionally to see how you do your work."

"Oh, mother, that will be delightful," cried Norah, clapping her hands. "See if I don't earn a good mark every time you visit me. I shall take such a pride in doing it all myself, that I am sure it will be neat and tidy enough even to please you, Mrs. Prim.

"It won't be so very hard either, you know," she added, "for I have always had simple bedroom duties ever since I was quite a little girl. I never think of getting up in the morning without throwing open the

indow to let in the fresh air, unless, of course, there a fog or the rain is beating on the house. Then, too, always throw the bed-clothes, one by one, carefully over the foot of the bed, and stretch them across the backs of two chairs, as you have shown me, so as to give them and the bed itself spread out to the fresh air, till it is time to make it again."

"Well, in addition to these things," said her mother, "you will now have to make your bed, empty the bedroom slops, leave the wash-stand and everything on it clean and neat, dust and tidy the room every day, and one day in each week clean it thoroughly.

"Contrary to my usual practice, I have to-day left your bed unmade till now, that I may assist you to make it. To-morrow and for the future you will make for yourself without my help. So let us go upstairs and begin operations," and away they went.

"Here it is, you see, just as you left it in the morning," she said when they had reached the bedroom. Now, in this drawer you will find a clean white apron, large enough to cover your frock up all over, and I want you to remember that your first step, after washing your hands, will be to put this on; it will save the bed and bedding from getting soiled. Nothing looks nicer than a clean counterpane and spotless white sheets, and I should certainly be sorry to see dirty finger-marks or dirt of any kind on your bed.

"Your bed after all," she continued, "is an easy one to make, as it is a mattress, and not a feather bed. You will simply turn it over every day like this," and she suited the action to the word. "A feather bed requires to be well shaken, and then carefully smoothed out, after it has been turned.

"Now, as regards the bed-clothes, we wi



*laying this blanket smoothly over the m*  
*Then we will cover it with this sheet, w'*

spread smoothly and evenly, because we have to lie on it—we call it the under-sheet.”

“I suppose the blanket is put under it to make the part we lie on warm and snug,” said Norah.

“Yes, that’s it, dear,” said her mother; “and now what do we want next?”

“The bolster and pillow come next,” replied Norah.

“Right,” said her mother, “and remember they must both be well shaken before they are put in their places—the bolster straight across the head of the bed, with the under-sheet rolled round it, and the pillow on it. If there were two pillows, you should remember to place them with their open ends towards the outside of the bed.”

“Now you see, your bed is made so that you could lie on it comfortably. All we have to do is to cover it up. We draw the top-sheet up over the foot, spread it neatly and evenly in its place, and then proceed to do the same with the blankets, taking care to tuck both well in round the sides and foot of the bed.

“Nothing remains but to draw the counterpane up in like manner, spread it carefully and smoothly all over, and then turn down the blankets and top-sheet, so as to leave the white pillows to be seen.”

As she had proceeded with the work while speaking, she turned to Norah now and said, “There, dear, I have made your bed for the last time. I hope you will always take a pride in doing it as neatly.

“All your other work of keeping your room neat and tidy from day to day will be very simple,” she added; “*but while I am here I will give you a few hints about your weekly cleaning.*”

"You will begin the work by placing all the light articles of furniture out on the landing, for this will not only keep them from the dust, but will at the same time give you room to move about. The rest of the furniture may be covered up with dust-sheets. I need scarcely remind you that the window should be thrown wide open, and the door kept shut, for otherwise the dust would soon find its way into the rest of the house and it is not worth while making one room dirty to clean another.

"Your next step will be to turn the mattress up first at one end and then at the other, so that the bedstead and spring mattress may be wiped with a clean cloth, and the mattress itself well brushed; and after this the bed may be made in the usual way, except that you will take this opportunity of changing the sheets and pillow-cases. By the by, dear," she added, "in changing a pillow-case don't put it into your mouth, but hold it under your chin.

"The bed must next be covered with a dust-sheet and then after shaking the long curtains, and pinning them up to keep them out of the dust, you may proceed to take up the carpet and rug, rolling them up and taking them out of doors to be shaken and hung out for an airing, while the room-cleaning is going on.

"The walls should next be swept, and for this purpose you will use a long broom, with a clean cloth pinned over it."

"I shall sprinkle some wet tea-leaves on the floor as you do, mother, when I sweep," said Norah. "I always notice that you sweep without raising a cloud of dust as some people do."

"Yes, dear, but the tea-leaves must first be washed

and then squeezed tight," replied her mother. "We don't want them to stain the boards.

"After gathering up the dust in the dust-pan, your next step will be to clean the fire-place and polish the fire-irons. Before beginning this you will put on a coarse apron, and lay a hearth-cloth down, so as to avoid making blacklead marks on the floor.

"You may then wash your hands, clean the hearth, and put the fender and fire-irons back in their places: after which the windows, looking-glass, and pictures must be washed and polished.

"I almost forgot to say," she added, "that all the articles on the wash-stand must be washed in hot water and soda, and then polished with a soft cloth.

"Every other week the floor will be scrubbed with carbolic soap; but you must then be careful not to put the carpet down again till the floor itself is quite dry.

"Nothing more remains to be done except to dust the things and put them all back in their places, and then, Norah, your work will have been so well carried out, that I think the inspector will give you a good mark when she comes to see it."

"There is certainly a great deal more to do in cleaning a bedroom than I thought, mother," said Norah; "but I mean to do my best. I shall put it all down, step by step, in a little book, so that I may not omit anything, or do anything in the wrong order."

*Summary.*—A tidy girl will always take a pride in keeping her bedroom a pattern of neatness. Remember that a badly made bed, in a close stuffy room, means a bad night's rest, and an unrefreshed feeling on waking in the morning.

## CLEANING THE SITTING-ROOM

"Suppose we change places this morning, No said her mother. "This, you know, is my day cleaning the sitting-room; and as you have a hol from school to-day, you shall be the inspector, watch how I do my work."

"Oh, that will be funny," said Norah. "W she added, with a merry little laugh, "I'll try and you as good a mark for your work as I can. Inspe Norah! How will that sound, mother? Won't fa laugh when I tell him," and so she rattled on.

"Oh, I have no doubt you will feel all the dig of your new position, dear," replied her mother. "remember, it is always possible for every one, eve inspector, to learn something, and I daresay it wi so in your case. But there, I mustn't stand gossi with the inspector, or I shall not get my work do and she began to bustle about.

Norah stood looking on for some time, as m cleared away the chairs and other portable articl furniture into the passage, covered up the rest dust-sheets, opened the window-sashes top and bot and then proceeded to mount the steps, and sli curtains off the poles.

"These thick rep curtains get very dusty," said. "They are all the better for a good shake an airing out of doors. That is why I frequ take them down; it is not much trouble, and it prev the dust from accumulating."

"Exactly," responded the inspector, with an ap *ing nod and smile*; but her fingers all the time

itching to help in some way, and after fidgeting about for a minute or two longer, she said, "Mother, would it be beneath the dignity of the inspector to help a little? I am sure she would rather do something than stand idly looking on."



"I should be much obliged to the inspector for any little assistance she could give me," replied her mother, with a mock smile.

"Ah, that's better," said Norah, tucking up her sleeves. "Now, mother dear, what shall I do?"

"Well now, we will first take up the carpet and



rug," said her mother. "This is an easy matter, as my carpets only cover the middle of the room.

"That will do," she said, when she had rolled them up. "Now you shall help me shake them. You may as well bring the table-cover with you," she added, "that too will want a shake and an airing."

When they returned she proceeded to spread some



sheets of newspaper on the table, and then she said, "Now, dear, you may gather up all the ornaments, and put them in the middle of the table on this paper. By and by you shall have the job of dusting them and putting them back in their places, but for the present we will cover them up with a dust-sheet, to keep them from the dust while the sweeping goes on."

When the walls and floor had been swept, and the

dust gathered up, she said, "Now for the fire-place and fire-irons."

"Ah, you will want your stove-brushes and black-lead, and the emery-cloth and leather," said Norah, as she bustled away to fetch them.

When she returned she found her mother had already raked out the ashes from the grate, and cleared away all the dust and dirt, and was waiting with the hearth-cloth spread out to receive the black things.

"My grates and fire-irons, which have a little attention bestowed upon them every day," she said, "are never in a bad state, you see, even at the end of the week ; but I will now show you what the weekly cleaning means."

She proceeded, as she spoke, to mix some blacklead into a paste, which she next laid lightly all over the grate with a small round brush. This done, she added, "Now, dear, elbow-grease will do the rest," and she set to work to brush it vigorously with a hard polishing brush till it shone like polished ebony. The emery-cloth and dry leather, in conjunction with some of that same elbow-grease, did as much for the fender and fire-irons, so that by the time she had done, you could have seen your face in those steel things.

"There," she said at last, "I think they will do ; but what does the inspector say ?" and she brushed up the hearth, preparatory to washing it and putting the fender and fire-irons back in their proper places.

"Excellent is the mark for that," said Inspector Norah, laughing ; "but what comes next, mother ?"

"Well, I will first wash my black hands, and then *you shall help me dust and polish the furniture*," replied her mother ; and following instructions Norah

dusted each article of furniture, piece by piece, with soft duster, and then left it for mother to polish. This was done with a soft rag, and a mixture made of bees-wax and turpentine, but mother said that her own elbow-grease was better than all the furniture



polish—indeed the best of furniture-polish would of little use without it.

The polishing work over, mother said, “This is *bigger* day than usual, dear, for I do not scrub the *floor* every week, but only occasionally from time *time*. It happens, however, to be my turn to

this one to-day, and I am glad of it, as it is an inspector's day," she laughed. "So while I get ready for it, you shall go and bring me a pail of warm water, a house-flannel, some soap, the scrubbing-brush, and a clean dry cloth."

"I always look upon the scrubbing as the hardest part of the work of cleaning a room," said her mother; "there is so much kneeling. You must never scrub a floor without using a thick mat to kneel on, as it is likely to cause injury to the knees."

"There are several things to bear in mind, too, in connection with the work itself," she added. "In the first place, one should always clean a small piece at a time, so that the edges as well as the middle may be easily reached. Then, too, each piece should well cover the edges of the last, or the floor might get a patchy appearance. Now, watch me as I go on."

She wetted a small part of the floor well with the house-flannel, and then proceeded to soap the scrubbing-brush, and scrub the boards.

"You see," she said, "plenty of elbow-grease is required here, too, and I want you to notice, as well, that I scrub the floor in the direction of the grain of the wood. This must always be done."

She next washed up the dirty water with the house-flannel, and rinsed it in the pail. Then, when she had wrung the flannel as dry as she could, she rubbed the boards with it, and finished them off with the drying cloth. So much elbow-grease did she put into this, that the part she had done looked white and dry by the time she left it, and so she proceeded, cleaning piece after piece till the whole floor was finished.

"Now," she said, "while the floor is drying we will

clean the windows, looking-glass, and pictures. By the time that is done the floor will be dry, and we shall be able to put the carpet down. It would never do to put it down yet, for, besides the evils arising from the damp floor, it would have the effect of turning our boards a bad colour."

The rest of the work was easily done. The carpet and rug were laid down, the furniture replaced, and then nothing was left but to dust, and put the room straight. The work of dusting the ornaments and putting them back in their places fell to Norah.

Once only had mother to interfere, and that was just when Norah was about to shake the duster. "My child," she said, "don't undo the work we have done. Take the duster outside and shake it"; and Norah at once saw what good advice that was.

"Even dusting requires considerable care, you see, dear," she added. "In the first place, you should always hold the duster loosely in the hand; never rolled up into a hard ball. Then, too, you should use it lightly, and not rub the articles, or you will rub the dirt into them; and last of all, although it is necessary to shake the duster frequently, this must never be done in the room itself."

"Well, we do look nice," said Norah at last. "But who was the inspector after all, mother?"

*Summary.*—Never make one place dirty, while cleaning another. Never leave a room to get very dirty before cleaning it. Remember, elbow-grease is the best of all polishers.

## MORE CLEANING

*Under her mother's careful training Norah was steadily becoming, in every sense of the word, a*

nesticated girl. Of course she still went to school, and her mother valued her education too highly to let anything interfere with her school duties. Hence she was as yet unable to take upon herself very much more of the daily and weekly house-work, beyond attending to her own bedroom.

That was a matter, however, which by this time lay very lightly on her shoulders, owing to the systematic way in which she had followed her mother's instructions from the commencement.

She found the window-cleaning a worry at first, as the corners were so troublesome, and the glass somehow had a knack of looking smeary when she had finished. Then, too, she was timid for some time, as the outsides had to be done; but, strange to say, her mother always found a pretext to be near at such times, with a word of advice and caution, and a little help too, if necessary, and the awkwardness soon wore off.

Now, with her bowl of clean cold water and a rag, a dry duster and a soft polishing leather, she would clean and polish windows as well as any one—and, like her mother, she took a pride in making them clean too. She had found out the secret of the smears, or, to speak more truthfully, mother had told her—and it made all the difference to her window-cleaning, for she would not think of trying to clean her windows now while the sun was shining on them.

You must not think that she did nothing outside her bedroom duties; she was her mother's right hand in all those constantly recurring matters, such as washing-up, and clearing away, and making everything neat and tidy after meals.

*Then, too, in the matter of shopping she was quite*

a woman, and for simple purchases of things required in the house, she could do as well as mother herself, and this of course was a great help.

Besides that, she was always down-stairs with mother in the morning, and as there was plenty to do at such times, Norah more often than not made the fire—and she could make a fire too with any girl.

It seemed a long time now since she first undertook to do it, and it used to be very amusing then to hear her repeat to herself mother's instructions, as she proceeded step by step. "Let me see," she would say, "I first rake out the ashes and cinders, because the fire will not burn without plenty of air; but I must do it gently, or the dust will fly all over the room. Next, I place a few of the largest and best of the cinders in the bottom of the grate, and on them I lay some pieces of dry paper loosely crumpled up. The wood comes next, and mother says the sticks must cross one another to leave room for the air to get between them. Lastly, on the top of the wood I lay some small pieces of coal."

Hands, of course, used to go to work as well as tongue all the time, and so, by carefully following instructions, the little woman was rewarded by seeing the fire burn up briskly as soon as she put a match to the paper.

It must not be thought that all this success came at once. She had her disappointments like every one else, but they only made her try again, till at last, as I said before, she could light a fire with anybody.

See her next outside with the cinder-sifter. Economy in all things was mother's watchword; she hated waste of any sort. Hence, as she had been taught, so from sheer habit at last, Norah always made

her next step to sift the cinders, and throw the ashes to the dust-bin.

Talking of washing-up, too, there need be no fear dirty marks round the handles of cups and jugs if Norah washed them. It was a picture to see her, with



her white apron, a bowl of steaming hot water, and a clean linen cloth, washing up the tea-things after tea.

Some careless girls might dip the cups, slops and saucers into the bowl—not so Norah. That was not the way she *had been taught*. No, she first emptied all the articles into the slop basin, and afterwards dipped



and washed them, one by one, in the bowl of hot water. Then she dipped them again in another bowl full of cold water, and, after this double dip, laid them aside to drain. How careful she was, too, not only to see that the handles received proper attention, but also to give the things a good polish, so that mother might



not have to find fault with her work. She will make a splendid housewife one of these days.

In the matter of washing up the greasy dinner things, it was some time before she could do it to her own satisfaction—much longer before she could satisfy mother entirely, but even this came by perseverance. Her mother's instructions were, "Plenty of hot water with a little piece of soda in it—a bowl of clean cold water close at hand—a clean dish-cloth—and a nice *clean soft linen cloth* for drying purposes.

Every article must first be scraped as clean as possible, and then washed separately with the dish-cloth in the hot water. A dip in the cold water must follow, and then each piece should be laid to drain before it is dried and polished.

There was one thing her mother impressed upon her from the first, and that was to see that the dish-cloth, instead of being thrown aside, was well washed, and hung out to dry and sweeten, after it had been used, so that it might be fit for use when it was next wanted; and this Norah never forgot. There was one other thing too, which, like the thoughtful girl she was, Norah always bore in mind, after she had once been shown. "Never throw the knives into hot water, dear," said mother. "It loosens and cracks the handles, and spoils them sooner than anything. Stand the blades in a jug of hot water for a few minutes, and then wipe them carefully. That will be quite sufficient."

Sometimes she would beg to be allowed to clean the front steps—I think she liked the girls to see her busy about the house—and after a time she did this as well as her mother herself; but at first, it must be confessed, the stones had rather a smeary, streaky appearance. They were sure to be clean, for she took great pains to sweep them well, and wash them carefully; but somehow she could not get the hearth-stone to cover them smoothly all over.

It was only the secret of a knack, however, after all, and she soon learned how easy it was to do it by rubbing the flannel lightly over the whitened stones in the direction from side to side.

Once when father came in, he found her in the ullery, with a coarse apron on, and her sleeves rolled

up, helping mother scour and polish the tins. "That's right, my little woman," he said, patting her on the shoulder; "there's nothing like actually doing a thing yourself, if you want to know how to do it. All the reading about it in the world is of no use without practice in doing it yourself, with your own two hands. Hands are given us for work, and I am proud to know that my little woman is not afraid of using hers. Plenty of soap and warm water will soon remove the dirt from those hands—honest dirt as it is—and I'll warrant there won't be any trace of it left when we sit down to tea presently."

"I say, mother," he added, after Norah had slipped away to make herself tidy, "what a gem of a wife and mother that girl will make some day; thanks to your training. She will be the very counterpart of the one who has made my home the happy place it is, and that is saying a great deal."

"Well, you see, dear," replied Mrs. Hunter, "if when she has a home of her own, she has to do the greater part of her household work herself, she will have the satisfaction of knowing that it is properly done. If, on the other hand, she is well enough off to keep servants, she will be better able to see that they do the work properly, because she herself will know all about it."

"Yes, my dear," replied her husband, "this training in housewifery will be a grand thing for the girl, whether she has to live by and by in a cottage or a mansion; and you, like the good mother you are, have taught her the nobleness of home duties."

*Summary.*—Thoroughness in everything is the great secret of a clean wholesome home. Every girl should learn to recognise the nobleness of her home duties, and she will then take a pride in all she does.

## PART II.—FOOD: ITS PREPARATION AND CULINARY TREATMENT

### THE COOKERY CLASS

WE commenced our cookery lessons to-day, mother," said Norah, as she came in one afternoon. "I hope to become a really good cook in time. I mean to try hard to learn all I can, for I think it will be the roughest day of my life, when father sits down to dinner all of my own cooking. Of course that will not be just yet, I know, but then I shall not mind waiting, for every one must have a beginning."

"Quite right, dear," replied her mother: "never in a hurry. Success comes to those who work diligently and patiently, not to those who want to do everything in a great rush. It is something, anyhow, to have made a start. By and by, when we can sit down quietly, you shall tell me all you can remember about your lesson."

When the leisure half-hour came, therefore, in the evening, mother said: "Now, Norah, I am ready; suppose we settle down for a chat. I should like to hear what you have been doing at your cookery class."

"Well, mother," said Norah, "perhaps before I tell you that, you would like me to say something about the kitchen itself, for it looks just like a real kitchen side, although it is only a sort of class-room, built on one end of the playground, after all.

"I said it was just like a real kitchen—well, I

was not thinking for the moment of the rows of desks on one side of the room. You don't find desks in an actual kitchen, of course, but those in our kitchen are for the girls to sit in during the lesson.

"As soon as we had taken our seats, we began to look round to see what sort of place it was. The first thing to strike me was the great cooking stove in the middle of the room. It is a gas-stove like yours, mother, only larger. The long tables, one on the right and the other on the left of it, looked something like the counter of a shop, and there was dear Miss Brown standing behind it, watching us girls, with a smile of amusement on her face. Miss Brown, you know, is the superintendent, and she is to have a cookery teacher to assist her.

"Behind the place where she stood, and facing our desks, is a fine large dresser, with the shelves full of plates and dishes, and there are plenty of drawers and cupboards besides, where I suppose she keeps all the things she requires.

"Another part of the room, separated from the rest, is fitted up as a scullery, with a sink and a plate rack over it, and a strong deal table for washing up, and shelves on the walls, where the pots and pans and other kitchen utensils are kept.

"There is something else in the room, mother, which you would not find in an ordinary kitchen. Just at the right of Miss Brown, as she stood behind the counter—I mean the table—is a large blackboard on an easel, with chalk and duster ready to hand. *These things*, and the desks in which we were sitting, made us remember that, after all, we were in school, and I don't think any girl could have been frivolous—

We all felt we were there for work, and just the sort of work girls like, too."



*"I am very much interested with your description, "*

in all you have told me, and I am now curious to learn something about that new and improved oven you were mentioning when mother called me away."

"Well, dear," replied her father, "the oven I had in my mind when I was speaking was a most remarkable one. I am sure you would never think of anything half so strange; so we will imagine ourselves to be standing near a group of these people, watching one of them—usually, as I said before, the head of the family—prepare the dinner.

"He takes the animal which is to be cooked, strips it of its fur or feathers, as the case may be, and then thrusts it inside some larger animal. A wood fire is burning as usual on the pebbles in the hole, and he merely makes a hollow in the midst of the glowing embers, and places in it the two animals (one inside the other), drawing the red-hot ashes and pebbles close round again, so as to cover it up completely. His work is over, and they all sit round, and long for dinner-time to come."

"Why, father, it looks as if the outside animal itself was the oven," said Norah, "but I should think it would be burned up to a cinder in those red-hot ashes. How horrible to think of such a thing!"

"Yes, Norah, you have guessed right," said her father. "The outside animal was indeed the oven, and, as you imagine, it was always burned up to a cinder. It certainly does not accord with our ideas of things, but then those poor savages would not see with our eyes, dear, especially when they found *their* dinner was well cooked; and we are told that *the food* cooked in this way was delicious.

"Our little book mentions another oven in use i

be won at the end of the course, and I mean to have one of those prizes, mother.

"And now, I think," she added, "I have told you enough about our kitchen and its arrangements for the present. Suppose I tell you something about the lesson itself. Well, we began with a good laugh, anyhow, and we learned a new name for ourselves—at least I had never heard it till then. Miss Brown, without saying a word, wrote on the blackboard the sentence, *Man is a cooking animal*; and then, when she turned to us with one of her usual smiles, it all seemed so funny that we burst out laughing. You would have laughed, I am sure, if you had been there, mother; and I think Miss Brown enjoyed the fun as much as we did, for she laughed too. Then she told us that this was the very answer somebody once gave, when asked for a definition of man. It must have been a very good definition, too, for of course we are the only animals that cook their food.

"Miss Brown says that as we are all cooking animals, and our food has to be cooked in some fashion or other, it is very essential that we should learn to do it properly. She spent a long time talking to us about the importance of this part of the woman's work, and she says that it is often pitiable to see how, in some homes, really good food is wasted and spoiled by the cooking.

"In speaking of the origin of cooking, she said the art, in some form or other, is so old that no one can tell how or when it was first learned. It seems to have come with the earliest dawn of civilisation; for our oldest records describe the cooking of food as a *well-known art*, even in the dim and distant ages



thousands of years ago. She thinks that probably those primitive tribes first lighted upon the discovery by some lucky sort of accident."

"Why, Norah, that just reminds me of the funniest story I ever heard," said her father, who till then had been sitting reading his paper, and listening between whiles to the conversation. "The story was first told by a very funny writer, Charles Lamb, and I think it is called *The Origin of Roast Pig*," he added, laughing heartily at the thought of it.

"Oh, father, please tell me the story," said Norah. "I am sure it must be very funny, or the mere recollection of it would not amuse you so much."

*Summary.*—Cleanliness is the first essential in a cook—a good cook must be a clean cook. Girls should strive hard to learn to cook. Good food is frequently wasted and spoiled by the cooking.

### FATHER'S STORY

"Once upon a time (so runs the story) there lived in China a worthy peasant named Ho-ti, who was blest with a great hulking, overgrown lout of a boy, called Bo-bo.

"This hopeful youth was, on one occasion, left in charge of the cottage during his father's absence, and for want of something better to do, he amused himself by playing with the fire, never dreaming, poor fellow, of the consequences.

As their straw bed lay in one corner of the room, it is not surprising that in a very short time the house was in flames, and the dear boy ran out into the woods, screaming with fright.

"After a while he ventured to creep back to the

pot, but the sight that met his bewildered gaze paralysed him with terror—their home was a heap of ashes. There he stood rooted to the spot, with his eyes starting from their sockets, for he had a most wholesome dread of his father's cudgel, and what to do to him he knew not. Should he run away into the woods, and never come back again?

"Presently, as these thoughts passed through his dull mind, there floated up to his nostrils from the smoking ashes the most delicious odour he had ever felt. What could it be? He, even then, so far forgot his terror as to stoop down and begin raking about among the ashes.

"The moment he did so, however, his terror and the thought of that cudgel returned with redoubled force, for as he raked, he came upon the bodies of the whole litter of little pigs, which, in his first fright, he had left shut up in the burning cottage, when he slammed the door and ran away.

"He laid his hand on one of them to see if it was really dead, poor little piggie! But he drew it back rather so much more quickly, and as a matter of course jammed his burnt fingers into his mouth; when, oh yes! what a delicious taste. He fairly danced with delight. No more thought of running away from home now. What did he care for cudgels, with which a tempting feast lay at his feet!

"Down he sat among the embers, and at the risk of burning his fingers, he dragged one of the roasted pigs out, and was soon busily engaged devouring it with might and main.

"So intent was he on his rich feast, that he did not hear his father return, or if he heard he paid no

heed. Down came the cudgel, raining blow after blow upon his luckless head and shoulders, but he heeded it no more than if it had been a wisp of straw. Neither the belabouring itself nor the loud angry tones of his father's voice were able to drive him from the banquet. He only clutched it the more fiercely in both hands, and kept cramming it all the while into his mouth till he was in danger of choking.

"Dodging the blows as well as he could, and looking up at his father, with a sorrowful ill-used expression on his stolid face, he could only cry, as he pointed to the half-devoured pig, 'Oh, father, nicey chow chow, burnty piggie,' and then he would fall to again as eagerly as ever.

"Whether Ho-ti thought his son was demented or not the story does not tell, but he at last tore the remnants from his grasp, and then, preparatory to a further application of the cudgel, he licked his greasy fingers.

"But oh! the next moment away went the cudgel and with tears of joy he flung himself on his dear boy's neck, and hugged and embraced him, begging to be allowed to share the feast.

"They did share it too, for one by one the whole of the litter disappeared—I think there were nine altogether—and when father and son reluctantly rose from the spot, it was with the strictest injunctions and promises on both sides to keep their grand secret to themselves.

"Next morning they set to work to build a new cottage, and more pigs were bought; but great was the astonishment of the neighbours a short time afterwards to find that there was another fire at Ho-ti's house—it was once again burned to the ground.

"Still the secret did not leak out, and again and again, as each new house was built, it was sure to be in a blaze before long; and what surprised the neighbours beyond all was that there was no more cudgelling or abuse of Bo-bo—father and son were on the very best of terms.

"This was too much for the community; they accordingly set a watch, and then the whole truth became known. Ho-ti had been purposely setting fire to his house, to eat burnt pig.

"Of course this was a very wicked thing to do, if only on account of the danger to the neighbours' houses, and consequently father and son were brought to trial for their offence. Everything, so says the story, was going dead against them, till at last the burnt pig was brought into the court, and handed round for the judge and jury to examine.

"To examine meant to taste, and what do you think was the result of the tasting? Why, the prisoners were at once discharged with the verdict of 'not guilty'; and, stranger than all, the judge's house was found next day to be blazing away bravely. He, too, had acquired a taste for burnt pig.

"After this, instead of one fire, there were hundreds, and the gentlemen of the jury, and indeed the whole community, soon learned the delight of eating burnt pig; and day after day the sky was red with blazing houses of all sorts and sizes, till at last a shrewd clever man arose, who hit upon the discovery that when a pig was wanted, it was not necessary to burn down one's house to get it."

"Well, father," said Norah, whose eyes were brimming over with fun, "that is a delightful little story

although of course it is only a make-up. The Chinese may be very funny people, but I don't think they are quite so bad as that after all."

*Summary.*—Food when cooked has a more savoury and appetising flavour than in its raw state.

### ADVANTAGES OF COOKING THE FOOD

"Oh, girls," said Norah, "I have such a funny tale to tell you. Sit down and listen; Miss Brown won't be here for quite ten minutes yet."

She had been very much tickled with the story of Bo-bo and the roast pig, and had made up her mind to take the first opportunity of repeating it to the other girls. She did repeat it, too, seated in the centre of the whole group; and so well did she tell the story, that when Miss Brown entered the room she found her pupils all convulsed with laughter, for they had just got as far as the judge and his pig-roasting operations.

Of course, with her usual good-nature, Miss Brown wanted to know what it all meant, for she always entered heartily into their fun; and though she had heard the story many times before, she was very much amused at the quaint way Norah told it.

"Yes," she said, "it is indeed a very funny story, but anyhow it will help us to make a start with our lesson to-day. Now," she asked, when the girls had taken their places, "what do you think it was that induced all those people in the story to roast their pigs?"

"I suppose it must have been the savoury smell and delicious taste of the cooked meat," said Norah.

"Exactly," replied Miss Brown, "and laughable as

the story is, it pictures well the delight and rapture which must have been felt by the savage when for the first time he tasted cooked meat, after being accustomed all his life to feed like a wild beast on the raw flesh of the animals he caught. Depend upon it, after that first experience, he would have very little appetite for raw flesh.

"The newly-found pleasure, which even his rough-and-ready cookery gave to his senses of smell and taste, would be quite inducement enough for him—he in fact knew no other; and that has ever since been the main inducement to the *cooking animal* all over the world. The food, when cooked, has a more savoury, delicious flavour than in its raw state.

"But I am now going to show you that there are other, and more important, reasons for cooking our food, beyond the mere gratification of the senses," she added; and as she spoke she produced a piece of shin of beef, which till then had been lying in a plate on the dresser behind her.

"I have here a slice of meat," she said. "Come and cut it up into small pieces, Norah. Ah," she continued, as Norah hacked away at it with the knife, "you find it somewhat difficult to cut, don't you? It is very tough; it is in fact the toughest part of the bullock, and that is why I have chosen it. I think your teeth would find it a very tough morsel if you tried, like one of those primitive savages, to make a meal of it as it is."

She next took a stew-pan from the stove and emptied its contents into a dish on the table, the pleasant smell from it filling the room as she did so.

"That must be nice," said Mary Jones. "The

very smell of it makes my mouth water, although I can't be very hungry just now."

"Yes, girls," said Miss Brown, "we have the same desire for nice things as poor Bo-bo had; but it is not the flavour of the meat which I want you to notice just now. This is some of the same tough shin of beef as I have on the table. Indeed, I divided the piece this morning into two portions—one lies there, raw and tough still; we are now going to examine the other, which has been cooked. Take a knife and fork and see whether you can cut this piece more easily than you did the raw meat, Norah."

Of course Norah found no difficulty at all this time in cutting the meat up into small pieces—the cooking had made the tough flesh quite tender.

"Now think for a moment about our lessons on the composition, properties, and nutritive value of food," continued Miss Brown. "In dealing with that part of our subject, you remember, we examined a piece of beef, as a sample of all kinds of meat; and we found that it contained flesh-forming, fuel, and mineral matters. Perhaps you can tell me which part of the meat supplies each of these three materials."

"The lean parts of the meat consist chiefly of albumen and fibrin," said Nellie, "and these are the flesh-formers. The fat supplies us with fuel food, and there is a small quantity of earthy or mineral matter."

"Very good indeed, Nellie," said Miss Brown, "and it is important to remember that, meat has exactly the same composition and properties in its raw state, as it possesses after it is cooked. In other words, the cooking, although it improves the flavour of the meat, adds nothing to it.

Now let us turn to its nutritive value. What



What happens to all food if it is to be of any nutritive value to our bodies?"



"It must be digested," replied Norah. "Undigested food cannot do us any good."

"Quite right, Norah," said Miss Brown; "and of course you remember that *digest and dissolve mean exactly the same thing*. Now, therefore, I think you will be easily able to see another very important reason why we cook our food, beyond that of making it nicer and more appetising."

"The cooked meat is tender," said Norah, "and must therefore be more easily masticated and digested, I suppose, than it would be in its raw state. But is it the same with other food as it is with meat?"

"We will see," replied Miss Brown. "I have some rice in this dish. If you take a few grains in your mouth and chew them, you will not only find that they have very little flavour, but that you have considerable difficulty in masticating them. You would not like to have to make a meal of this food, I am sure."

"There is another dish of rice on the dresser, Norah. Hand it to me, please, and we will examine the two side by side. This morning I put the same quantity of rice into each dish; one I placed in the oven, the other has been standing where you found it."

"Did you say you put exactly the same amount into both dishes?" asked Norah with surprise.

"Yes," replied Miss Brown, "I measured a cupful into each, but our cooked rice pudding has swollen up so that it nearly fills the dish now."

The girls could scarcely believe their eyes, for of course it was the cooking that had made the difference.

"Now I want you to tell me what is the chief constituent of rice," Miss Brown went on.

"Rice consists almost entirely of pure starch," replied Norah.

"Quite true," said Miss Brown, "and that is the main reason why I have chosen rice to illustrate the vegetable foods, for starch, as you know, is the most important constituent of them all."

She then led the girls to think about the nature of the starch-cells, and showed them some drawings of what these cells would look like if they were examined with the aid of the microscope.

"Now," she continued, "we will have a very old and familiar experiment"; and she mixed a little ordinary starch in water, and then poured boiling water on it from the kettle.

"You know from your former lessons what effect the boiling water has had on the starch, girls," she said. "It has simply made the tiny cells swell up till they burst. Now let us look at our rice pudding."

She divided it with a spoon as she spoke and handed a portion of it round on a plate, pointing out that the grains of rice were now swollen up to more than double their original size, and that they were no longer hard and brittle, but soft and jelly-like, and easily digestible. The starch-cells had swollen and burst with the cooking.

"We will take another example of these starch-foods," she continued. "Here is a raw potato; I don't think any of you would care to make a meal of it as it is. It would not be very tasty, and it would certainly be far from digestible. Now open the oven, Norah, and you will find there a potato which has been cooked."

*Norah did so, and placed on the table a fine*

potato, which had swollen up so much in the cooking that its skin had split and burst in several places, so that the white, "floury," "mealy" inside was seen protruding through the cracks. Miss Brown explained that this "mealy" portion of the potato was simply the mass of starch-cells, which the heat had swollen and burst open. Then she showed the girls a drawing of these starch-cells of the potato, as they would appear under the microscope.

"Now," she said in conclusion, "I want you to remember from these two examples—the rice and the potato—that cooking is as necessary for vegetable as for animal food. It improves the flavour of the food, and at the same time makes it more digestible. In fact, vegetable food stands more in need of cooking than any other, because the hard starch-cells of which it is composed are very indigestible; they would be useless as food, unless they were broken up and softened by the cooking."

*Summary.*—Cooking makes food more digestible, as well as more tasty. Most of our vegetable food would be indigestible, and therefore useless to us unless it were cooked.

## THE EARLIEST COOKS

"I happened to come across a little book on a book-stall to-day, Norah," said her father, "and I thought it might interest you in connection with your cookery lessons, so I bought it. Here it is. Shall we have a look through it? But, I say," he added, "before we open the book, I want to ask you a question. Who was the very first cook?"

Norah looked puzzled. "Why, father," she

replied, "Miss Brown says the art of cooking is so old, that no one knows anything of its origin."

"Ah, but I know who was the very first cook," he said,— "I can even tell you his name," and Norah opened her eyes wider still with astonishment. "The sun was the very first cook," he continued. "Thousands and thousands of years ago he began his cooking operations. Yet he still carries on the business, and a very excellent cook he is too."

"Think of the hard green apples, and pears, and plums, as you have seen them hanging in the early summer on Aunt Jane's trees—so hard, tough, and woody that we could not digest them, and so sour and bitter as to be not only unpleasant to the taste, but positively injurious, if one tried to eat them. This, you know, is the condition of all fruit at first."

"But what a difference there is in the fruit when it is fit to gather. Then all the bitterness and sourness are gone; the ripe fruit is full of rich, sweet, luscious juice; and besides this it is so soft that it will melt in one's mouth. That wonderful cook, the sun, does it all."

"I see now, father, why you called the sun a cook," said Norah. "Miss Brown says the object of cooking is to render the food digestible, and at the same time make it more pleasant to the taste; and of course this is just what the sun does to the fruit."

"I have here some fruit," said her father, as he showed her a handful of raisins, "which not only ripened as they grew, but have been still further cooked in the sun."

"Oh yes," said Norah, "Miss Brown says raisins and currants are hung in the sun to dry after they

are cut. This sun-drying, or cooking, as you call it, causes most of the watery part of the juice to evaporate so that the fruit will keep for a long time."

"But our friend, the sun, does not limit his operations to cooking fruit, dear," added her father. "Travellers in some of the dark, benighted parts of the world frequently meet with savage tribes, who, although totally ignorant of cooking as we understand it, nevertheless make use of the sun as their *chef*. In the sun-cooking they simply hang up the raw fish or fowl in the open air, and leave it there till it is quite dry but simple as the treatment is, they find the food more palatable than it would be in its raw state."

"I shouldn't like to eat either fish or meat cooked in that way, father," said Norah.

"I suppose not, dear," said her father, with a smile twinkle in his eye, "and yet our bloaters and haddocks are mostly sun-dried, and bacon is simply raw pork which has been salted and dried. It is true we do not eat these things as those savages would, but even to suit our palate they require less cooking than they would in their raw state, because they are partly cooked already. A bloater, for instance, requires less cooking than a fresh herring, and a rasher of bacon much less than a slice of pork. But let us leave this sun-cooking now," he added. "Here is a picture showing some very primitive cooking-operations—probably the first that man learned, after becoming acquainted with the use of fire. It carries us back thousands of years to a time commonly known as the stone age, when these *savage* races dwelt in caves in the rocks, and the only implements in use were a few sharpened flints.

"Here you see the family seated round the"

while one, probably the father, is engaged in the delicate operation of cooking the dinner. He has cut a stout wooden stake, one end of which he has driven into the ground in a slanting position over the fire, so that the animal, which is impaled upon the upper end of it, may be within reach of the flames. This animal,



by the by, and the other lying near at hand, are the result, no doubt, of the day's chase.

Very primitive cooking is this, and very primitive dining will it be, by and by, when the father-cook announces the banquet. Needless to say, their fingers will be their only forks, and a piece of sharp flint must do duty for a knife. What do you think of our first cooking animal, Norah ? ”

“ Poor creatures,” she replied, “ I am very thankful *did not live* in those horrid times. But how do we *now all this*, father ? ”

"Well, dear, from time to time the caves in which these early savages lived have been discovered, both in our own country and in foreign lands," said her father; "and in the caves rings or circles of wood-ashes, the remains of their fires, have been found, as well as the sharpened flints, which served them for knives and weapons of the chase. These are the only records we have of the people of this distant age, but they tell their tale plainly enough.

"Our little book describes this as *The First Roast*. Suppose we turn now to the next chapter, which is entitled *The First Bakers*. Here we find a distinct improvement in the cooking operations,—our *Cooking Animal* is learning better methods as time goes on. He begins by scraping out a hole in the ground (you can scarcely call it digging). The sides and bottom of this hole he lines thick with pebble stones, and on the stones themselves he makes his fire of wood. No doubt you are wondering what it all means. I will tell you. This is his first attempt at making an oven, and he is going to bake his dinner. As soon as the fire has made the pebbles very hot, he will sweep it to one side of the hole, and lay the animal which is to be cooked on the hot stones. He will next pile the rest of the red-hot pebbles over it, and then draw the fire close round the heap, covering it at last with turf. This completes *his* cooking arrangements, dear."

"What a strange oven, father," said Norah. "But after all, the poor people no doubt found it an improvement on the early method of roasting over the fire, for *they* could certainly cook their food, even in that rude oven, without charring and burning it all over.

"Yes," replied her father, "but I expect they found

another drawback, when the dirt and ashes riddled through the pebbles, and made their dinner gritty, for the next chapter in our little book gives an account of *An Improved Oven*.

Mother called Norah just at that moment to assist



her in the household duties, and as she ran off her father said, "We'll finish our chat by and by, dear."

*Summary.*—The sun is really a cook. It ripens the growing fruits and vegetables, and makes them more digestible and more pleasant to the taste. Savage people in some parts of the world cook meat and fish in a rough sort of way by hanging them in the sun.

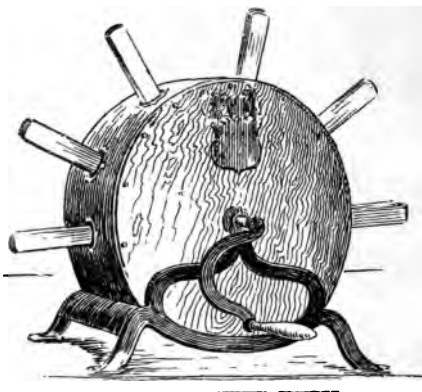
## IMPROVEMENTS IN THE EARLY ART

"You promised, father, to tell me something more about those early savages, and their first attempts at cooking," said Norah. "I am very much interested



brick-dust into a paste with linseed oil, lay it on with one rag, and polish with another rag or a leather, and some dry brick-dust.

“I may add that if, from any unforeseen accident, it is ever found to be impossible to clean the pots and pans immediately after using them, they should be stood in cold water till they can be cleaned.”



KNIFE-CLEANING MACHINE.

“I always think knives, and forks, and spoons require very careful cleaning, mother,” said Norah. “Miss Brown has a great deal of trouble with some of the girls and their knife-cleaning. I don’t think they can have had as much practice at home as I have had, or they would not be so awkward now.

“We have a knife-board and a knife-cleaning machine as well in our kitchen. I think most of the girls like the fun of putting the knives into the machine, and turning the handle. That is all so easy, for it polishes the knives very quickly, and without much

ouble. But I don't think some of them care much for the work of the knife-board. I expect it requires more hard rubbing than they like, especially that part of the life nearest the handle. Most of the girls get sent back at first to do this again, for they nearly always leave it with a black mark.

"Miss Brown says, too, they spoil the edges of the knives, by rubbing them against the board; and I shall never forget how angry she was when one girl, without thinking, put the knives, handles and all, into hot water, although she had warned us all not to do it."

*Summary.*—Never put any of the kitchen utensils away dirty. They should all be cleaned and scoured as soon as possible after they are used, and put back in their places to be ready when they are wanted again.

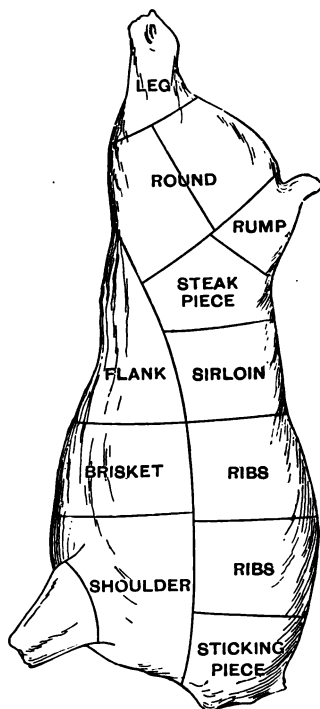
## HOW TO CHOOSE MEAT

"We are going to have our first real chat about meat to-day, girls," began Miss Brown. "I need scarcely remind you that, before we can expect to be able to prepare any meal satisfactorily, it is very essential to know the nature of the food we are cooking. This is especially the case as regards meat.

"Think of the carcasses of beef, mutton, and pork, they hang in the butchers' shops; very little of them is wasted, for almost every part of these animals is used for food.

"Yet, all parts of the carcase are not of equal value. There are choice, tender, juicy parts which cut up into joints for roasting, baking, and boiling; and there are other parts which are hard, tough, and coarse texture, and are only fit for stewing."

"Of course the rich people buy all the best joints," said Nellie. "I suppose they never use any of the coarse, hard parts."



"Nellie is quite wrong," said Miss Brown, "although I am very glad her little interruption came when it did, for it will enable me now to make you all clearly understand the whole matter. All parts of the animal can be made into good nourishing food; but everything depends upon the cook, for each part has its own special use, and must have its own special treatment. The coarser portions would never do for roasting or baking, for such treatment would make them harder, tougher, and coarser than before. But you must not think that

they are of little or no value; for these parts are the best of all for stews and soups.

"It would not only be very wasteful to buy the choice portions of the meat for stewing purposes, but the stew, or the soup itself, would be less nutritive than that made from cheaper parts of the beast.

"Hence you see, Nellie, it is in the highest degree *essential*, for rich as well as poor people, to know the *nature and value* of every part of the animal, so that

each part may be put to its proper use. There is no surer economy in the household management than that.

"I have here a drawing which shows how the carcass of an ox is usually cut up. I say usually, because the way of cutting up the animal is not always the same everywhere. This is the method most generally followed in England, although butchers vary it in different parts of the country; and in Scotland the joints are altogether different.

"Now let us follow our drawing. The rump, sirloin, ribs, and round are the choicest cuts—the



SIRLOIN OF BEEF.

sirloin and ribs for roasting, the rump for steaks, and the round, or buttock as it is also called, for either roasting or boiling. A boiled, salted round of beef makes a grand cold dish.

"The aitch-bone, which is the upper part of the round nearest the rump, is a very useful joint—better for boiling perhaps than roasting. It is always sold cheap, as it contains a very large bone, but the meat is sweet, tender, and juicy.

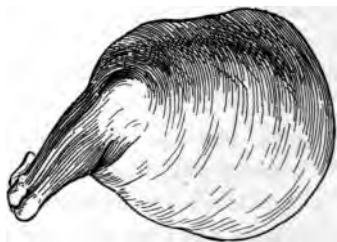
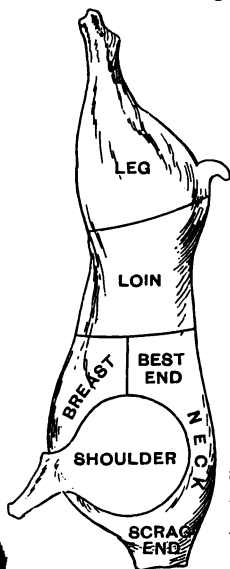
"The shoulder, brisket, and flank (thick and thin) are generally salted and boiled. They would be hard, tasteless, and far from economical as roast joints.

"The cheapest parts of the carcass are the head, the neck, or sticking-piece as it is sometimes called, the leg, and the shin. All these are useful for stewing, and make most economical and nutritious soups. Beef-tea for the sick-room is always made with good leg of beef."

"I have heard of ox-tail soup," said Norah. "Do cooks use the tail of the ox to make soup?"

"Yes, Norah, even the tail has its use," replied Miss Brown, "and it makes a very choice soup."

"Before we leave this part of our subject, I have another picture to show you," she added. "This explains how the carcass of a sheep is cut up. The leg, shoulder, and loin are the choicest parts—the leg for either roasting or boiling, the loin and shoulder for roasting. The loin and the best end of the neck are also cut into chops. The joint, known as saddle of mutton, is formed of the two loins; it makes a delicious roast. The



SHOULDER OF MUTTON.

scrag end of the neck, the breast, and the head are useful for stewing purposes; they make excellent broth.

"Now I want to remind you that there are many parts of the animal which cannot be

own in our picture, but which nevertheless provide most valuable food."

"Oh yes," said Norah, "there are the bones. Mother often buys bones from the butcher, to put into the stock-pot for making soup; and I remember you once told us that when bones are boiled, they yield a valuable, glue-like flesh-former, called gelatine."

"Quite true, Norah," said Miss Brown; "and if you allow the liquor, in which the bones have been boiled, to stand till it is cold, you will find that it is indeed a glue-like substance. It is very rich and nutritious. Now can you think of any other parts of the animal that we have not yet mentioned?"

"There are all the inside parts, such as the heart, liver, and kidneys," said Mary Jones.

"Certainly," replied Miss Brown. "These all make good, wholesome, nourishing food, and so does the sweetbread; but everything depends upon the cooking. Bad, ignorant, careless cooking would render them valueless as far as nutriment is concerned.

"Tripe, again, is a very valuable article of food; it is prepared from the stomach of the animal. Lastly, we come to the feet. Cow-heels, or neats' feet as they are also called, make good wholesome soup, when properly prepared, for, with gentle boiling, they yield abundance of gelatine. Sheep's feet are boiled and sold as trotters."

*Summary.*—Special joints of meat are useful for special purposes. The prime joints are for roasting and boiling. It would be very wasteful to use these for stews and soups. The rough, coarser parts are best suited for these purposes.

## MORE HINTS ON CHOOSING MEAT

"How did you like our last lesson, Maggie?" asked Norah of her cousin on their way to the class.

"I liked it very much indeed," replied Maggie; "and of course I learned a great many useful things I did not know before. I know now which parts of the animal supply the various joints, and I can tell the prime joints from the inferior ones."

"Then, too," interrupted Norah, "we know that each is useful for its own special purpose, and that even the coarse parts only require proper cooking to make good wholesome food."

"There is one thing which has just occurred to my mind," she added. "Mother is more particular, I think, about the meat than about anything else she buys. She always goes to one butcher, and I have often heard her say she never had a bit of bad meat from his shop. That makes me think there must be bad meat about, as well as good, in some of the shops. I should like to be able to tell bad meat from good, for although one knows exactly what joint she requires, it seems to me we are not always sure of getting good meat, unless we understand all about it."

"That is quite right, girls," said Miss Brown, who had just come up, and overheard Norah's remark. "Your wish is soon to be gratified, as the subject for to-day is '*good and bad meat*.'" As soon as the girls had all assembled, therefore, Miss Brown began.

"Our lesson to-day," she said, "is intended to give you some valuable advice as to the choice of meat. I do not refer now to the kind of joint, for we have

already dealt with that subject; but I want to lead you to distinguish, for yourselves, between bad meat and good.

"We should never forget that these animals, whose flesh supplies us with food, are liable to diseases of various sorts. The flesh of a diseased animal could not be eaten without great risk; and therefore it is of the utmost importance to see that one gets none but good healthy meat from the butcher. It would certainly be much better to abstain from meat altogether, than to eat the flesh of a diseased animal.

"I daresay you are wondering why there should be any diseased or bad meat at all in the shops. Well, of course, there would not be any, if all people were honest. It is only unprincipled people who send such meat to market. A farmer or grazier of this stamp, who finds some of his cattle or sheep suffering from disease, thinks only of his own pocket, and not of the harm he is likely to do to hundreds of people.

"He kills the animals, diseased as they are, hurries them off to market, and pockets the money, careless of consequences. Nay, it is even worse than that; for very frequently the animals die, and their dead diseased carcasses are dressed and sent away to market, as if they were healthy beasts, and had been slaughtered in the proper way. No wonder is it that vigilant inspectors are required in all our markets; and no wonder that so many tons of meat are condemned by these inspectors as unfit for food.

"Good meat should always be fairly fat, for unhealthy animals, like sick people, waste away. It is much more advisable to choose a lean portion from a *fat beast*, than a joint without fat. Even if there is



more fat than you want, it can always be cut off and used for suet.

“The lean parts of good meat should be of a bright red colour, and there should be streaks of fat mingled with it, giving it a marbled appearance. Very deep purple-looking meat usually indicates that the animal instead of being slaughtered in the proper way, has died (probably of some disease) with the blood in it; pale, bloodless, pink-looking meat points out a badly nourished, and therefore unwholesome animal. Neither of these is fit for food.

“Good meat, of whatever sort, should be firm and elastic to the touch. If, instead of this, it has a flabby watery look, and leaves a dent when it is pressed with the finger, be sure it is not the flesh of a healthy animal—there is something wrong with it.

“An ox about four years old is considered to be in its prime. Very young meat would be less firm than this; very old meat is coarse in texture, juiceless and tough.

“Whenever you see meat lying in a pool of wet with the fat looking soft and flabby, avoid it; it is usually unwholesome, and not worth purchasing at any price.

“Lastly, there should be no unpleasant smell in meat; but it often happens that, when the meat is bad, there is not only a disagreeable odour arising from it, but the very smell of the drugs and physics with which the animal has been dosed, can be detected, especially when it is put down to the fire to cook.

“The smallest mutton is generally the best. *Leicester* and *Lincoln* sheep are larger and fatter as a rule than the *South Down*; but their flesh is coarser.

flavoured. You will easily know these, because they have white faces and white feet, while the South Down sheep have black faces and feet. The most delicious mutton of all is that of the small Welsh sheep, but it is scarce and fetches a high price.

"I cannot leave this important subject without warning you against pork, for of all animals whose flesh supplies us with food, none is so likely to convey disease as the pig.

"Under certain conditions this animal is liable to become infested with living parasites, which commence their existence in its stomach, and increase and multiply so rapidly, that millions of their species are soon to be found in every part of the body.

"One of these is the germ or embryo of the tape-worm. It gives the flesh of the animals a 'measly' appearance. The embryo, strange to say, will never become a tape-worm, as long as it remains in the flesh of the pig; but if a person were to eat a piece of this 'measled' pork, the germs would be rapidly developed into actual tape-worms.

"Another of these parasites is a tiny thing, which appears little more than a white speck to the naked eye. Like the germ of the tape-worm, these things multiply to such an extent in the stomach, and bore their way into every structure with such marvellous rapidity, that in a few days no part of the animal is free from them.

"If pork of this kind is eaten, it gives rise to a painful and very often fatal disease known as Trichinosis.

"Fortunately, science steps in here to save us from *evil consequences*. It has been found by experiment

that none of these parasites can stand the heat of boiling water. If people will remember this, and only take care to see that pork is thoroughly cooked—that every part of it is brought well under the influence of the heat—there need be no fear, for any parasites that may be in it will be effectually killed, and the danger consequently removed.

“Trichinosis has been very common in Germany, for there imperfectly cooked sausages form a large item in the food of the people.”

*Summary.*—Avoid meat which is soft and flabby and has a watery look. Avoid meat which is pale and bloodless in appearance. The lean should be of a bright red colour, with streaks of fat intermingled with it. Pork should always be eaten with caution.

## ROASTING

“May I help you cook the dinner, mother?” asked Norah one morning. “It is not often I get the chance, you know, but as there is no school to-day, I should like to help you, if you will let me.”

“Yes, dear, you shall,” replied her mother; “and I’ll tell you what we will do. It is a long time since we had a bit of real roast meat, as I always cook now either with the gas-stove or the kitchener. We will roast the meat in front of the open range in the scullery to-day for a change. It will seem like old times to have the roasting screen and jack in front of the fire once more.”

“The first business will be to light the fire. You *can do that* as well as I can, so you had better start *at once*, for I must have a clear bright red fire before

I can think of putting the meat down, and it will take some time to burn up. While you are making the fire, I will get the meat ready.'

Norah set to work, and in a few minutes there was every prospect of a good brisk cooking-fire, for she was a capital hand at fire-lighting.



THE ROYAL BARON OF BEEF.

When she had finished and swept up the hearth, she turned to her mother, who had put on a clean white apron, and was now busy at the table.

Norah washed her hands and put on a clean apron too, and then she asked,—

“What did you mean by saying you would get the meat ready, mother?”

“Well, dear,” replied her mother, “I always scrape

the outside of the joint, and wipe it with a clean damp cloth, and then I sprinkle a little flour and salt



FLOUR DREDGER.

on it. Here it is, you see; and now I have only to fasten it firmly on the hook of the jack with the thick end downwards, and it is ready for roasting as soon as our fire is bright enough."

When at length there was a good, hot, glowing fire, she drew the screen up close in front of it, after first winding up the jack, so that the meat might be kept constantly on the turn as it hung there.

"You see, dear," she said, "I have placed the joint close up within a few inches of the fire, and I shall let it remain there for about ten minutes."

"Oh yes, mother," said Norah, "I can tell you why you do that. You want the albumen to set and form a sort of coating all over the outside of the joint, so that the juices of the meat may not run away and be lost. Miss Brown has explained all this to us."

"Quite right," replied her mother. "Presently, when this is accomplished, I shall move it back, and leave it for the rest of the time about 15 or 18 inches from the fire. I want the meat to cook slowly and gradually, and then it will be tender as well as juicy. If I left it where it is, it would cook rapidly, and the great heat would make the fibres hard and tough."

"The screen is a great help in roasting," she added. "*Its bright polished surface reflects or throws back the heat which it receives from the fire, so that the*

joint, as it turns slowly round on the jack, gets not only the heat-rays direct from the fire in front, but also the reflected heat from the screen behind."

All this time the fat had been melting and falling



THE ROASTING JACK AND SCREEN.

into the pan below, so that there was now quite a little pool of hot dripping.

"We use this melted fat for basting the meat, don't we, mother?" asked Norah.

"Yes, dear," replied her mother, as she took some

of it up in the ladle and showed her how to do it. "This basting is a very important part of the cook's work in roasting a joint of meat, for it prevents the meat from getting dry and scorched with the great heat; and remember, the more it is basted the better it will taste.

"Our joint has plenty of fat of its own, but if I had a lean joint to cook, I should melt some dripping in the pan for basting purposes.

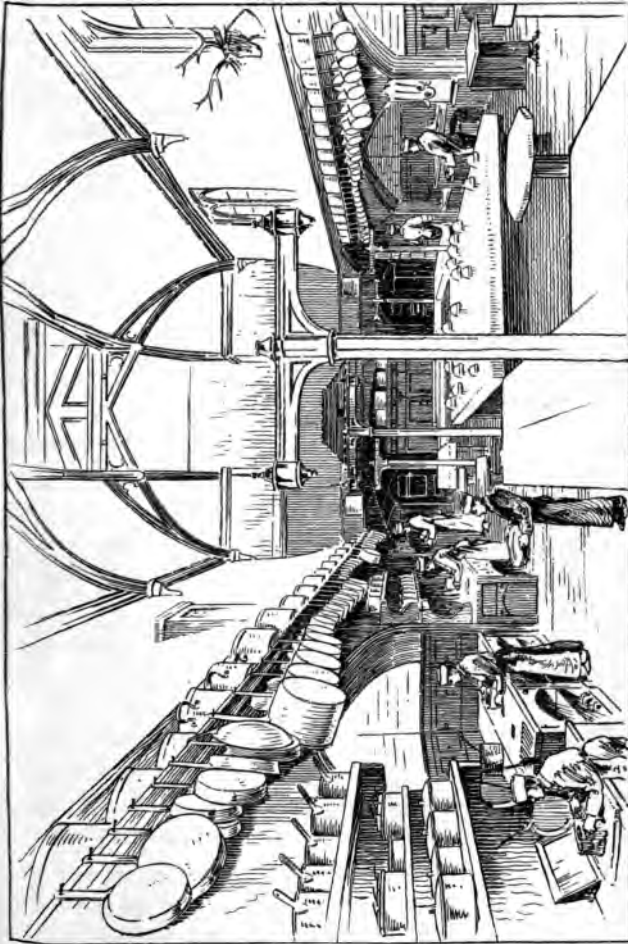
"And now," she added, "I think we have set the coat of albumen sufficiently, so we will move the joint back from the fire, and leave it to cook slowly. I have a pudding to make, and some other things to do, so you shall attend to the basting."

Presently looking up from the table, she added,—

"Your work is not very tiresome, you see, for the jack keeps the meat turning without any trouble on your part; you have nothing to do but baste it. When there is no jack it is usual to hang the joint from the mantel-shelf by means of a skein of worsted; and then it is necessary to twist the worsted from time to time, to keep it slowly spinning round. If it were left standing for only a minute, the joint would soon be badly scorched and charred."

"Do you know, mother," said Norah, who had been gazing very thoughtfully into the fire for some minutes, "I have been thinking about those poor savage people, and their early attempts at roasting. I am afraid their joints must have been very badly scorched on those awkward spits, for they had no better way of *turning them* than by pulling up the spit each time, and *as for basting*—well, of course, they could not do it, *for they had neither dripping-pan nor spoons.*"

"Ah, talking of spits, dear," said her mother, "I

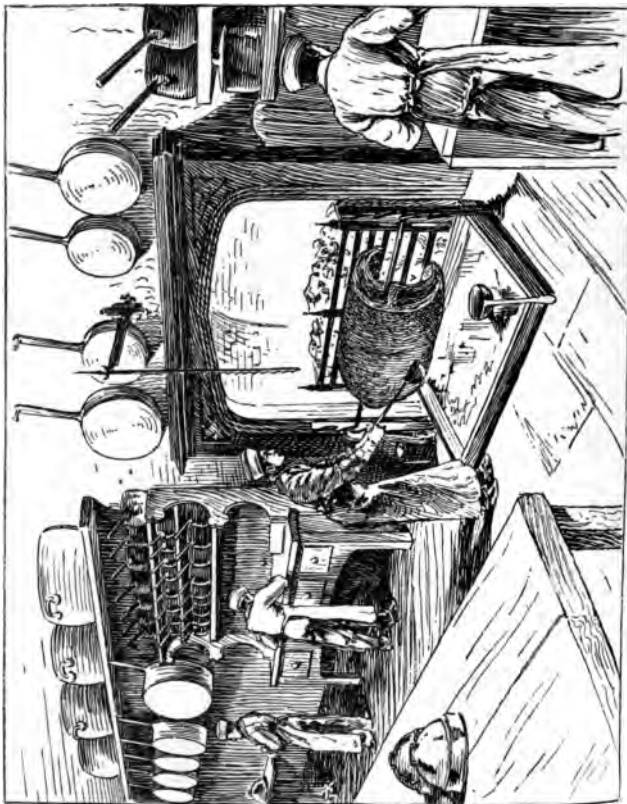


THE ROYAL KITCHEN—WINDSOR CASTLE.

should like you to see the Royal kitchen at Windsor Castle; the cooks there have some spits, and no mis



take. They do not stick them in the ground, it is true, for their spits revolve horizontally on massive



ROASTING THE BARON OF BEEF.—WIND.

supports in front of an immense fire. I daresay they could roast a whole side of beef on one of them.

*“As you are not likely to see the kitchen itself, I will show you a picture of it, where the cooks are engaged in cooking a great Baron of Beef for the*

Queen's Christmas Dinner. A baron of beef consists of the whole of the double loin."

"There is another thing which is puzzling me, mother," said Norah, a few minutes later. "I can't understand how you know when the joint is done."

"Well, dear, that is easy enough," said her mother, "I allow a quarter of an hour for each pound, and a quarter of an hour over; and if the joint is thick through, I give it half an hour over. You see I have only to know the exact weight of the joint, and I can time the cooking exactly."

"This is my arrangement for beef," she added; "but I give mutton a little longer. For veal, pork, and lamb I always allow a good full twenty minutes for each pound and twenty minutes over, because all these, and especially pork, are very unwholesome unless they are well cooked."

*Summary.*—In roasting, put the joint down within a few inches of a clear, bright, red fire for about ten minutes, and then move it back and leave it for the rest of the time about fifteen or eighteen inches from the fire. Beef requires a quarter of an hour for every pound, and a quarter of an hour over; mutton requires longer, and veal and pork longer still.

## BAKING

It was Master Bob's birthday, and a very busy time his mother had in preparing for the event, for the children were to have their cousins and some other young people to tea in the afternoon. There was dinner, of course, to cook in the ordinary way, and in addition to that there were cakes and pies, tarts and scones, and I don't know what else to make for the children's tea-party.

Norah was her mother's right hand, as usual, but

poor Bob was not much use in the kitchen ; I think his mother preferred his room to his company at such times.

"Boys," she would say, "are so awkward ; they seem to get in one's way, when there is anything particular to do."

So they watched him start off with his cricket bat over his shoulder, and then she said, "We must first get the dinner on the way, Norah, and, as I shall have my hands pretty full, I will bake the meat to-day, for it will require less attention than it would if I roasted it, and our joint—a shoulder of mutton—is a good one for baking.

"I shall want the kitchen oven for the cakes and tarts, so we will cook the meat in the gas-stove."

"Why not cook them all together, mother?" asked Norah. "You would have plenty of room, I should think, in that large oven."

"Ah, dear," replied her mother, "that would never do, or we would spoil them all. The kind of baking which meat requires would make pastry heavy ; neither could cakes or bread be put into the same oven with tarts and pies, for one would spoil the other."

"I am surprised at that, mother," said Norah. "I have seen you cook all sorts of things in this oven ; and the oven itself seems such a simple affair, that I always thought you had nothing to do but put the food into it, and it would cook itself. I don't see what you can do when once the oven door is shut."

"Well, dear, you will have a good opportunity of learning something about baking to-day," said her mother. "At any rate you will find that, simple as the oven looks, it requires a considerable amount of management. It is by knowing how to manage it that

I am able to use it, as you say, for almost every kind of cooking."

"Now let us see about putting the meat in," she added as she opened the door of the gas-stove.

Norah felt the sudden glow of heat on her face, and looking in she saw that all the gas-jets were burning full—the oven was very hot.

"There," said her mother, as she placed the shoulder of mutton on the grid, with the under side down, and then shut the door again quickly, "that is just the heat I want for about ten or twelve minutes. By and by I will lower it."

"Then I suppose, mother," said Norah, "it is just the same as in roasting. You want the albumen to set first in a coating on the outside, and then you will leave the meat to cook slowly through. But I don't understand how you can do that, for you can't move the joint away from the heat while it is in the oven."

"Oh, that is a very easy matter," said her mother. "I shall simply turn down the gas to a glimmer, and that will diminish the heat."

"Why, of course, that will be just the same as moving the joint back from the fire, won't it?" said Norah. "I had not thought of that. But how do you manage with the oven in the kitchen rang



## BAKING

ther?" she asked again, "you can't turn a tap to  
ver the heat there."

"No, as you say, I can't turn a tap," said her  
other; "but still I can lower the heat of the oven  
hen I wish. I will show you how I do it. This—



iron plate in the back of the stove is called a damper  
it is drawn out now, but it can easily be pushed  
While it is drawn out in this position, all the fla  
smoke, and heat from the fire must pass round  
outside of the oven, before it can get to the chim  
and it is this which makes the oven hot.  
"The moment I push this damper back and

one of the others, I shut off the flames from the oven, and they have to pass up another flue to get to the chimney. Now I think you will see that it is quite as easy to regulate the heat in the oven of the kitchen range as it is in the gas-stove."

"Oh thank you, mother!" said Norah, her sparkling eyes showing the interest she felt, "I am so glad I know the proper use of those dampers. I think that must be a very clever arrangement."

"Well now, our joint has been long enough in that great heat," said her mother; "we will turn the gas down, and then I must prepare my pastry."

"How do you manage about basting the meat in the oven, mother?" asked Norah.

"Well, dear, you may baste it occasionally and the meat will be better for it; but there is not so much need to baste a baking joint, as one that is being roasted, because in this case the meat is cooked by the heated air of the oven, and not by the direct rays of heat from the fire. Then again our shoulder of mutton is sure to be rather fat, and will baste itself. If I have a lean joint to bake, I always put some dripping on the top of it, and leave it to melt and run down over the meat.

"You must be careful of one thing, and that is about opening and shutting the door. The door should not be opened too often, and it should always be shut gently, for if it is banged roughly it sends a sudden rush of cold air into the oven. This, however, is more hurtful to pastry than meat, for it would have the effect of making the pastry heavy."

Norah busied herself peeling the potatoes and *cutting the beans*, while her mother made the pies and

pastry. This of course was rather a long task, but when at last they were all ready for the oven, her mother said, "Now, dear, let us prepare for a little more baking"; and as she spoke she opened the door of the oven, and put a piece of stale bread into it.

"What is that for, mother?" asked Norah.

"I want to find whether the oven is hot enough for my pastry," replied her mother. "Pastry requires a hot, quick oven; if in five minutes that piece of bread becomes crisp and turns a golden colour, I shall know that our oven is just hot enough to bake the tarts and other things on the table. Another way of testing the heat is to put a sheet of writing-paper into the oven. If the paper curls up at once, we may know that we have a suitable heat for our purpose."

"Capital," she said, as she took out the piece of bread, now crisp and yellow, and then she proceeded to put the pastry into the oven. While these were baking, she set to work and made some cakes, Norah, of course, watching and helping where she could.

"The oven will be just ready for these," she added, "when the pastry is done; but it will be necessary, as soon as the cakes begin to brown on the outside, to shut up the damper and lower the heat, that they may bake slowly and get well soaked; otherwise our cakes would be soft and pastry in the middle.

"I may add, too, that a loaf of bread requires exactly the same treatment, and for a similar reason. We shall be easily able to test whether our cakes are done, by thrusting a knife into the middle of them. The knife will come out clean, if they are thoroughly cooked."

*Summary.*—Bread and cakes require a slow oven. Unless they bake slowly and get well soaked, they will remain soft and doughy in the middle. Pastry requires a quick hot oven.

## BOILING AND STEWING

"I see you are busy, mother," said Norah a few mornings later, as she came into the kitchen. "What are we going to have for dinner to-day?"

"I am going to make a stew to-day, dear," replied her mother, "and I am just getting the things ready."

"Oh, one of your delicious stews, as father always calls them," said Norah. "I am so glad." Then after a minute or two she added, "Mother, I wish you would let me try and prepare the stew. We had a lesson about stewing and boiling yesterday. Miss Brown made everything so clear, that I think I should know what to do, especially if you would watch me and let me right when I make any mistakes. Do let me try"—and she looked up coaxingly into her mother's eyes as she spoke.

"Ah, I see what it is," said Mrs. Hunter, with a little laugh; "you want to rob your poor mother of her reputation. How do you think I shall feel, by and by, when I hear father ask for one of Norah's delicious stews? But there, I suppose I must let you try, and I should really like to see what you have learned at the class."

"In the first place, tell me what you understand of the great difference between boiling and stewing?"

"When we boil meat, the object is to make it tender, and at the same time to keep the juices in it," said Norah; "but in stewing, a large part of the nutriment is drawn out of the meat into the water, and makes gravy."

"*Exactly.* Now can you tell me how you would proceed if you had to boil a joint of meat?"



"Oh yes, mother," she replied. "I should wait till the water in the sauce-pan came to the boil and then I should put the meat in, and leave it for about ten or twelve minutes. After that I should move the saucepan back from the fire, and let it simmer gently till the meat was done."

"Very good indeed; now for your reasons, dear," said her mother.

"They are the same as in roasting and baking, mother," she replied. "We do not want to lose the goodness out of the meat, and so we make the albumen set and form a coat all over it, by putting it into boiling water at first. This keeps in the juices, which would otherwise ooze out into the water."

"Why don't we continue to boil it rapidly till it is done?" asked her mother.

"Ah, that would make the meat hard, tough, and stringy," she replied. "Miss Brown says meat must always be cooked slowly, and with a low heat, if we wish it to be tender."

"Quite right, dear," said her mother. "There is another method of boiling meat, which I sometimes adopt, but that is when I have an eye to the liquor in which it is boiled. In this case I put the meat into cold water, heat it slowly up to the boiling-point, then move it back from the fire, and leave it to simmer gently till it is done."

"The meat, cooked in this way, is sure to be tender, but a large amount of its gelatine and albumen oozes out into the water during the process, and makes excellent liquor for soup."

"Of course," she added, "even in your method of putting the meat into boiling water direct, it is impos-

sible to prevent some of the goodness from soaking out of the meat, and the water in which it is boiled should never be thrown away.

"In the ham-and-beef shops of London, and other large towns, the general practice is to put the meat into a large copper of cold water, raise it slowly and gradually to the boiling-point with a small fire, then rake out the fire, cover the copper over, and leave it till it is almost cold."

"To these people, the cooking is as all-important as the quality of the meat; and the meat cooked in this way is always tender and juicy. But, I say," she added, "this will never do. We must get on with our dinner and gossip afterwards, for a stew, especially if it is to be a delicious one, as you call it, takes time.

"Now, before we go a step further, I want you to understand that my stew, which you all like so much, is made, not of the prime, expensive parts of the meat, but of the coarser, cheaper cuts. This stewing beef would be very unsuitable for any other methods of cooking, but carefully stewed, it may be made quite as nutritious and tasty as the best parts. Here it is; now commence your operations. You will find the vegetables in the basket on the table."

It would have done any one good to see the careful, methodical way in which the little cook set to work. Her mother's eyes sparkled with pride and pleasure again and again as she watched the proceedings. She began by peeling and slicing the carrots and turnips, which her mother had already cleansed and prepared in readiness. This done, she proceeded to skin, scald, and shred the onions, just as she had seen Miss Brown *do it the day before*.

"Now," she said, "the next thing is to brown the meat," and she took down the stew-pan.

There was an approving smile on her mother's face



when, after taking the stew-pan down, Norah carefully wiped it out with a clean cloth. Of course it had been put away clean, but this one act showed how well the little woman was being trained. She knew

there must have been some dust about since it was put on the shelf, and she was determined to be a clean cook. Before she put anything into it, it was not much trouble to make sure that it was quite clean.

She next put a little dripping into the pan, and stood it over the fire till it was melted; and then she placed the meat in it, cut up into convenient-sized pieces, to brown. Mother's help was needed at this point, to give her a hint as to when it was sufficiently browned; and after that she put the vegetables into the pan, that they might be slightly browned too.

"Now," she said, when that was done, "we must get rid of as much of this fat as we can. Miss Brown says it is very necessary to pour away all the fat, or it would make the stew too greasy."

She accordingly poured away the fat, and as soon as that was done, proceeded to add sufficient warm water to well cover the meat and vegetables. Then she looked up at her mother, as much as to say, "Is that all right so far, mother?"

"Yes, dear," replied her mother, "that is capital. But I think you will improve your stew by adding a table-spoonful of ketchup."

She did this, and, after stirring it well up, placed the lid on the stew-pan, and set it where it would slowly and gently come to the boil.

"Well done," said her mother, and the expression on her face told how proud she was of her little cook. "I am longing for father to come home; but we will not tell him at first who cooked the dinner.

"Your stew will cook itself now, without any further trouble on your part, only you must be careful to see that it does not boil. Boiling would spoil it

altogether, for it would make this tough meat tougher still; but the longer it simmers the more tender it will get. Remember, too, we cannot hasten the cooking by increasing the heat, for a stew takes time, and will not be hurried.

"About half an hour before it is served we will break a little flour in warm water, stir it quite smooth, and add it to the stew, for that will thicken and improve the gravy. This will be the proper time too, to season it to taste with salt and pepper. It is not well to put salt in yet, as salt tends to harden the meat. I wonder what father will say when he is introduced to the new cook."

*Summary.*—The object of boiling meat is to make it tender, and at the same time to keep the juices in. It should be put into boiling water and allowed to boil for about ten or twelve minutes to set the albumen, after which it should be moved back from the fire and left to cook slowly.

## A GOSSIP

While the stew-pan simmered gently on the stove, Norah undertook to peel the potatoes, as her mother's duties now called her away, and she was likely to be engaged some little time.

She had just finished her task when mother peeped into the kitchen, and said: "Your stew smells very savoury and nice, dear," and as she spoke she lifted the lid of the stew-pan, to give it a stir, and skim off the scum which had risen to the surface.

"What a pity it is that this really valuable method of cooking is so badly understood, and so little practised, in the homes of our working-classes," she added. "A nicely prepared stew is not only a most

appetising and nutritious dish, but a most economical one for a family.

"The pound or so of meat, which in many a working-man's home is not obtained till the last possible moment, and is then frizzled up in a greasy frying-pan, without any regard either to flavour or nourishment, so long as it is ready when father comes in, would make, with proper management, a warm, tasty, satisfying meal for all."

"Yes, mother, and besides that, it is not necessary to buy the best parts of the meat for stewing," said Norah. "It is true our stew to-day is made of steak, but then it was a very coarse steak, only suitable for this purpose. It is cheaper than steak for frying, and so you can get more of it for the same money."

"That is exactly my contention, dear," replied her mother. "In many a poor home it is unfortunately the case that the children, and with them, in all probability, the mother too, scarcely touch meat for days together. The poor woman says to herself, 'Father has to work very hard, he must have what meat there is, we can do without meat.'

"Her heart is in the right place, it is only her training which is at fault. Why should not all of them—she and the children included—have a wholesome, satisfying meal? If she only knew, she could do it with no more outlay."

"What a contrast there is in this respect between the working-man's table in England and in France. The Frenchwoman seems to be a born cook, for with nothing but a few coarse scraps in the way of meat, and such vegetables as may be in season—indeed, I might almost say anything that comes to hand—she will

provide the daintiest of dishes for the family, while her English sister's prejudice in favour of a steak in the frying-pan leads to such unsatisfactory results."

"There always seems to be a great deal of waste too, in a steak which has been fried," said Norah.

"Yes, there certainly is more or less waste," replied her mother, "and the coarser the steak, the greater will be the amount of waste. But if the same steak instead of being fried, were nicely stewed, even the tough, sinewy parts would be softened and made perfectly digestible. But besides this, there would be no waste in the cooking, for all the goodness that soaks out of the meat must go into the gravy."

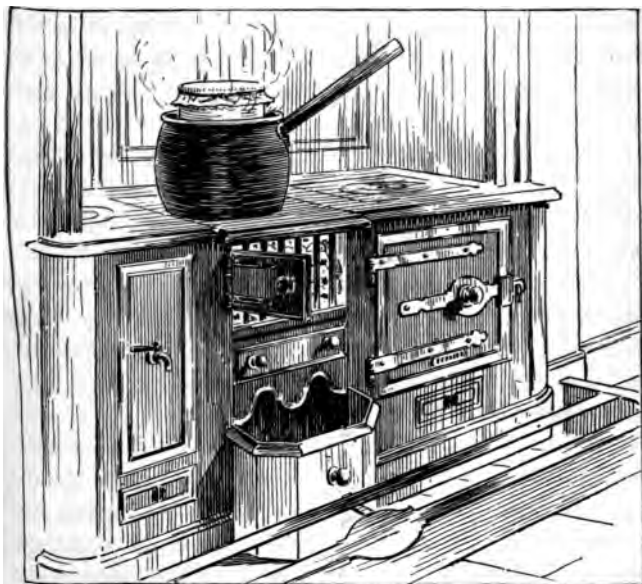
"Miss Brown's stew yesterday was made of leg of beef," said Norah. "She did not fry the meat first, to brown it, as we did the steak this morning. She says that all those very coarse, tough parts of the meat would be made tougher still if they were fried."

"She said it would take about four hours' gentle simmering over a low heat to make the leg of beef tender. But it was quite a surprise to all of us when she told us she would help it as much as she could before putting it into the stew-pan. How do you think she did it, mother? She cut the meat up into small pieces, and placed them in a dish with some vinegar for a few minutes. This, she says, helps to soften the fibres of tough meat better than anything else. But of course it is not necessary to do that with a steak such as we are stewing for dinner to-day."

"There is one thing that pleases me immensely," replied her mother, "and that is that my little girl is carefully storing up all she learns. It will come in

useful some day. Indeed, I think father will say it has come in useful already, when he knows who the cook is to-day.

"I am glad, too, that you seem to understand the real principles of stewing, Norah. There must be no



boiling—nothing but gentle simmering over a low heat. Do you remember our jugged hare?"

"Oh yes, mother," replied Norah, "it was delicious."

"Well, that was a sort of stew," said her mother. "The hare itself was old and tough; it would have been tougher still if I had roasted it. Knowing this, I cut it up and put it into an earthenware jar, with a few slices of bacon, some onions shredded very fine, a



little seasoning, in the way of sweet herbs, cloves, and lemon peel; and then, after adding enough water to cover it and a little pepper and salt, I closed the jar with a greased paper tied securely over it, and placed it in a sauce-pan of cold water.

"I stood the sauce-pan on the fire, and allowed it to come gradually to the boil, and there I left it boiling for about four hours. I think you'll agree with me that the tough hare was tender and juicy enough when we sat down to dinner."

"Yes, it certainly was, mother," replied Norah, "but that is just what I cannot understand, for you say it boiled for about four hours. I thought that hard boiling would have made the meat tough."

"You forget, dear, that it was only the water in the sauce-pan that was boiling," said her mother. "The heat could only reach the stew inside the earthenware jar very gradually—indeed, it never boiled, it simply simmered gently all the time."

"This is one of the best methods of making a delicate stew, for as it never comes to the boil, the meat is sure to be tender, while the close covering over the top of the jar keeps in all the flavour. I sometimes put the jar into a slow oven instead of the sauce-pan of water; this is as good a plan, but it takes longer."

*Summary.*—A good stew is a most appetising and nutritious dish, and a most economical one for a family. In preparing a stew there must be no boiling—nothing but gentle simmering over a slow fire.

## FRYING AND BROILING

A day or two later Norah came home looking very pleased.

"What is it, dear?" asked her mother, "have you learned something new this morning?"

"Yes, mother," replied Norah. "Our lesson to-day was about the frying-pan and its work, and I have learned a great deal that was new to me. Miss Brown says that in the hands of a skilful cook the frying-pan is a most serviceable implement, the great misfortune being that its proper use is not sufficiently well understood. But I think after our lesson to-day we girls at any rate ought to know something about it, mother."

"Miss Brown is quite right, dear," replied her mother. "It is a well-known fact that many a housewife, although she makes very frequent use of the frying-pan, because it is a quick and easy method of cooking, does little more than scorch and frizzle up the outside of the meat, whilst the inside is all but raw; and this, for the want of knowing better, she calls frying. Now let me hear something about your lesson, Norah."

"Well, mother," said Norah, "although our lesson was about the frying-pan, Miss Brown began by calling our attention to a shallow sauce-pan or stew-pan which she had in readiness on the table. She reminded us that frying of every sort is simply a method of cooking food in hot fat, and while speaking, she proceeded to put up some dripping into the pan, which she placed on the top of the stove.

When the fat was melted she said, "Now, girls, we will begin by frying these cutlets, and you see I have enough melted fat in the pan to cover them completely. This is the *best* method of frying; the common, but *wrong way* is to use a frying-pan and only a little fat.

"She then went on to explain that the fat must be made hot before the meat is put into it, because the great heat from this hot fat serves to harden the albumen, and so form a coating all over, to keep the juices in, and at the same time prevent the meat from getting sodden with grease.

"She was very careful, however, to see that the fat did not get too hot, and she showed us how to test the heat by putting a piece of bread into it. When after a minute or so, she took it out, the bread was quite crisp, and of a golden brown colour.

"She said the fat was then at the proper heat, and ready for her purpose. It was quite still in the pan, without bubbling, and a thin bluish vapour was rising from it. If she had left it longer, it would have begun to smoke and smell, and then it would not be fit to use. This, she says, often happens when frying is done over an open fire; and meat cooked in this over-heated fat is sure to get a burnt taste, and to be hard and tough.

"Well, the cutlets were put into the pan, and in about six or seven minutes Miss Brown took them out, and laid them in a warm dish, on a sheet of white paper, to drain. They were then quite done, and lightly browned all over."

"You have certainly paid great attention to your lesson, dear," said her mother. "I think I shall soon be able to trust my new cook with the frying-pan. The great secret is to have fat enough, and be sure that it is hot enough, and then your fry will be perfect.

"The same method may be used for beef-steaks, kidneys, chops, sweetbreads, and fish. Indeed this is the method always adopted in large establish-

ments, where much frying has to be done. It is usually known as wet frying,—sometimes as French frying.



*“Strange as it may appear, the food cooked in this way is never greasy, if it is properly drained before serving; and it is not so wasteful as it seems at first sight, for the same fat can be used over and over again, care being*

taken, of course, to keep that separate which has been used for fish.

"Various kinds of fat are used for frying, such as olive oil, lard, butter, and dripping. Lard, however, is likely to make the food greasy; butter and oil are too costly, except for well-to-do people; good beef dripping, or clarified mutton fat, is best for ordinary purposes."

"We had some other frying after the cutlets were cooked, mother," said Norah, "but that was done in the frying-pan. Miss Brown, after standing the frying-pan on the stove, and allowing it to get hot, put a rasher of bacon into it, and we began to think she had made a mistake and forgotten the fat. Before we had time to make any remark, however, the bacon began to splutter and frizzle, and we could see that it was cooking. The heat of the pan was melting the fat of the bacon itself, there was no need for any other fat.

"Miss Brown explained that this is known as dry frying, but we could see she was not very much in favour of it. She says all those things that can be fried in this way are better by far if broiled over the fire, or toasted in front of it."

"I am no friend to the frying-pan and dry frying myself," said her mother. "Indeed, whenever I can, I use the grill in preference to frying of any sort. I certainly think meat tastes sweeter and more wholesome when broiled than with the best of frying. I am going to grill a steak for father by and by. You shall watch me do it."

Accordingly, when the time came for cooking the *steak*, Norah was by her mother's side.

"Now," she said, "the first essential in grilling or broiling is a clear hot fire, without any smoke or flame, for, I need scarcely tell you, the smoke from the coals would not improve the taste of the meat. The next thing is to see that the gridiron is quite clean, and then I will place it over the fire to get hot, before I put the meat on it"; and as she spoke she uttered the action to the word.

"You see," she added, "the bright hot fire and the hot bars of the grid at once serve to harden the albumen on the outside of the meat, so as to close the pores and keep the juices in."

As soon as the meat was put on the grill it began to splutter, and some of the melted fat from it dropped into the fire below, giving rise to a number of tongues of flame, which played all round it. During the cooking mother turned the steak again and again, by sticking a fork into the fat; but Norah



GRIDIRON.

noticed that the fork was never put into the lean, and of course she asked her mother about it.

"I never put the fork into the meat," replied her mother, "because that would allow the juices of the meat to escape; but it does no harm to pierce the fat. Many people use tongs for this purpose, and they are *certainly better than a fork*, but one has to be careful

not to squeeze the meat even with these, or that would be as bad as piercing it with a fork."

*Summary.*—In wet frying, or French frying, as it is called, the food is made to swim in boiling fat. Bacon and ham are put into the frying-pan without any fat. Their own fat is sufficient to fry them. This is known as dry frying. Grilling is preferable to dry frying.

### HOW TO CHOOSE AND PREPARE POULTRY

When the girls next met in class the first thing to attract their attention was a fowl, which Miss Brown had placed on the table in readiness for the lesson.

"We are going to learn something about poultry to-day, I suppose," said one to the other as they all took their seats.

"I hope we are," said Mary Jones. "I should like very much to know how to prepare fowls and ducks and geese for the table. They are not like a joint of meat; they require so much preparation before they are fit for cooking."

"Yes, Mary, you are right," said Miss Brown, who had overheard her last words; "and now suppose we turn our attention to this fowl, and see what we can learn from it.

"In the first place you can see that it is only half-plucked. I had it left in this state in order that I might have the opportunity of showing you the right way of proceeding, for the work of stripping off the feathers is not the easiest part of the preparation of these poultry birds. It requires a considerable amount of care and patience, for otherwise the skin is very liable to be torn as the feathers are plucked out.

"See," she continued, suiting the action to the

l, "I stretch the skin by pressing it back with the  
nb and fore-finger of my left hand, while with the



er hand I pluck the feathers, one by one, in the  
tion in which they grow. By using care, and re-



membering that 'the more haste the less speed,' there need be no danger of breaking the skin.

"Practice has made this a very simple matter to me, and as I can talk as well as work, you shall watch me finish the plucking, and listen to what I have to say at the same time.

"I want to give you a few hints as to choosing poultry. Young birds, of course, are the best, for their flesh is tender and juicy, while the flesh of old birds is tough and coarser in flavour.

"You could not pick out a young bird from an old one by merely seeing them in the shops; but you can make quite sure by examining their beaks and feet. The beak of an old bird is hard, horny, and rigid, and so is the breast-bone; but in a young bird these parts are soft and flexible. The feet and legs of an old bird are rough and scaly, but those of a young bird have a much smoother appearance. The flesh of good, well-fed birds, too, is always plump and firm to the touch.

"Poultry, again, should be fresh killed, and the eye is the best test of their freshness, for if the bird is not fresh, the eyes will have a sunken look.

"The flesh of fowls, turkeys, and pigeons should be white; that of ducks and geese is darker in colour. But even in these birds, if the dark colour is accompanied by any unpleasant smell, you may be sure that decay of some sort has already set in, and the flesh is not fit to eat."

By this time she had finished plucking the fowl, and the next step was to singe it, so as to remove the *long straggling hairs*. This she did by passing the *bird lightly* and quickly over the flame of one of the *gas-jets* near at hand.

"Now," she continued, "our next business is to w the fowl. I want you to watch carefully how o it."

She began by laying the bird on its breast and ting the skin along the back of the neck from the y to the head. Then, after first chopping off the d, she loosened and pulled down this skin and led it back over the breast; after which she cut off neck close to the root.

"Now," she said, "my next step is to remove the p and the windpipe, and for this operation we must n the bird over on its back."

This she did; and then by carefully inserting her sers into the opening at the root of the neck, she ckly and easily drew out first the crop and after- ds the windpipe, wiping the opening and the flap skin with a damp cloth to remove the blood.

She next proceeded to open the other end of the l, first cutting off the vent, and then making an vard slit with a sharp knife about two inches from middle.

Through the opening thus made she drew out all internal parts of the bird. While doing so, she in and again pointed out the necessity of using ry care, for if this part of the operation is carelessly e, there is great danger of breaking the gall-bladder he liver, and that would make the flesh bitter and seous.

She showed them that the proper way is to care- y insert the fingers upwards towards the breast, . then it is easy to draw all the inside out together. |  
 "There," she said, as she wiped the opening with mp cloth, "our fowl is drawn now and ready fo-

trussing. There are two methods of trussing a fowl, according as it is intended for roasting or boiling. We will proceed to truss this one for roasting; I will afterwards explain the other method."

She began by cutting off the toes at the first joint, and then she proceeded to place the legs in boiling water. The girls wondered what was coming next, and they were not a little surprised when they saw her, a few minutes after, peel off the scalded skin rapidly and easily from the legs so as to leave them clean.

That done, she folded the flap of skin from the



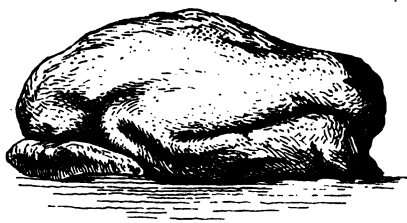
FWL TRUSSED FOR ROASTING.

neck neatly over the opening at its root, and then turned the wings back in such a way that, when a skewer was run through the pinions, it kept them and the flap of skin both in their places.

"Now," she said, "we have only to secure the legs and our fowl will be ready for the fire." So saying she pushed the legs back close to the sides, and after first crossing them, tied them securely with a piece of string round the parson's nose—the funny name given to the tail end of the bird.

"This finishes our preparation for roasting," she said, "except that the liver and gizzard are to be placed in the wings of the bird. But before I can do the

remove the gall-bladder from the liver, and cut the gizzard so as to remove the coarse skin and is inside it. Then after washing both in cold



FOWL TRUSSED FOR BOILING.

they will be ready to be skewered in their own the two wings.

preparing a fowl for boiling," she continued, "the wings are cut off at the first joint, and the remaining parts are forced up into the body by loosening the skin round them. The skin of the breast and the back of the legs are then tied securely together, so that the whole is inside; and the liver, instead of being skewered into the wing, is put inside the bird."

*try.*—Old birds can easily be known by the hard, horny appearance of their bills, and the rough, coarse, scaly appearance of their legs. Poultry requires great care in plucking, drawing, and

## SOUP

"Are you making soup, mother?" asked Norah, as she found her mother busy with her preparations.

"No, dear, I am not exactly making soup yet," answered her mother; "but I am preparing my stock, which is to provide us with soup for the next day."

You know I always endeavour to clear out

my stock-pot entirely, and start afresh at least once a week ; and during the summer time I never keep the same stock longer than two or three days at the most."

"May I stay and help you, mother?" she asked again.

"Certainly," replied her mother. "As you are aware, I am a great advocate for soups of all kinds, and you cannot do better than learn something of their importance. For my part, I never can understand why soup is not more generally used by our working classes than it is.

"When properly made it costs very little, and yet it provides good, nutritive, and easily-digested food. Nothing is more comforting to the stomach than a plate of nice hot soup, for it is not only easily digested itself, but it also acts upon the walls of the stomach, and causes the gastric juice to flow freely, and thus helps to digest the solid food which is taken afterwards.

"Now suppose we set to work to prepare our stock-pot," she continued. "I always use a tin sauce-pan for my stock, as it is so easily kept clean, and I need scarcely remind you that in this, as in all other cooking operations, cleanliness is the first essential.

"Into this sauce-pan I put, first of all, two or three pennyworth of bones, which I get the butcher to chop into small pieces, and to these I add the bones from the last joint. Then I put in all sorts of odd scraps of meat, raw or cooked, which cannot be used for any other purpose ; even pieces of skin are not to be despised, for they are all useful here, and must not be thrown away. Nothing indeed is wasted where there is a stock-pot. Even the gravy left over from stews *will make* a valuable ingredient here. See what a

orange collection I have on the table; we will put them all into the pot.

"Nothing more is required but to fill up with cold water, or with the liquor in which meat has been boiled, if there is any at hand; and then the pot may be covered up close with the lid, and left to simmer gently for hours, without any further trouble, except to remove the scum from time to time, as it rises."

"I think I can tell you why bones and pieces of skin and gristle are useful in the stock-pot, mother," said Norah. "I remember Miss Brown saying that all these things yield a very valuable flesh-former, called gelatine, when they are boiled. I suppose it is this gelatine which makes the rich stock for soup."

"Yes, dear, you are right," replied her mother; and if you were to look into our stock-pot to-morrow, when it is cold, you would find, beneath the surface layer of fat, a mass of clear solid jelly, which we could eat and enjoy in that state, or make into rich delicious soup as we pleased.

"What a pity it is that this valuable knowledge is not more widely spread among our poorer classes," she continued. "Think what a help those despised bones and scraps would be to thousands of poor struggling members of families, if they only knew what you know."

"Miss Brown says beef bones make the best soup," said Norah. "Indeed, she says, all cooks prefer beef before any other meat for making soup."

"Yes, dear, that is so," replied her mother; "although good, nourishing broth can be made from the rag end of the neck of mutton, and from scraps and cuttings of veal. Chicken and rabbit broth, too, &

ooked upon as delicacies—the first, in fact, forms a  
right dainty dish for the sick-room.”



“Miss Brown says that one of the reasons

beef is so much better than other meat for making soups is, that it is not drained of its blood as other meat is," said Norah; "and that the blood is rich in iron. I remember I was very much surprised when I first heard it, but I know now that iron forms an important part of our mineral food."

"The one feature about the stock-pot is, that we can make the same material supply the foundation for many sorts of delicious, appetising soups," said her mother. "Think, for example, how I ring the changes on haricot, lentil, and green-pea soups, with the help of different flavouring herbs. The green peas, by the by, are only the dried green peas, which can be obtained at any time of the year from the corn-chandler."

"I simply soak the peas or beans in cold water over-night, with a small piece of soda to help to soften them; and in the morning I pour the water away, put them into a sauce-pan with an onion or two and enough water to well cover them, and leave them to boil slowly till they are soft."

"I then rub them through a wire sieve or a colander with a wooden spoon, and return them to the sauce-pan in which they were boiled. This crushing is very necessary with haricot beans, as the skins are tough and indigestible; it is not so essential with peas."

"Nothing then remains but to add a sufficient quantity of the ready-made stock from the stock-pot, season to taste with pepper and salt and one or more of the flavouring herbs, and leave it to boil up again. This gives us a most nutritive and delicious soup."

"Among the herbs which I commonly use as flavourings," she added, "are parsley, thyme, marjoram, sorrel, sage, and mint. The best plan is to put them



into a small muslin bag, and hang the bag by a string in the soup, so that it may be removed before serving. Sometimes I use a little celery seed, as your father likes the flavour of celery, and this, as well as the herbs, I put into a muslin bag."

"Is the pea-soup, which you sometimes make, prepared in the same way, mother?" asked Norah.

"No, dear, I always make that from the liquor in which pork, ham, or bacon has been boiled—that forms my stock. The peas for this are the yellow split peas, which you buy at the corn-chandler's shop. They, like the dried green peas, require careful soaking overnight, and must be passed through a colander or a wire sieve, with the turnips, carrots, and onions which I always use to enrich the soup.

"I think," she added, in conclusion, "I have now said enough to show you the value of soups as an article of diet. Some day we will have a talk about a few of my special treats, such as tomato, ox-tail, mulligatawny, and kidney soups, and a few which are made altogether of vegetables, without the aid of the stock-pot."

*Summary.*—Bones make the best of all material for the stock-pot. Good stock affords the foundation for all sorts of delicious appetising soups.

## HOW TO CHOOSE FISH

"The subject before us to-day, girls, is fish," began Miss Brown, when the class next assembled. "In one of our earlier lessons we discussed the value of fish as an article of food. Suppose we make that lesson our starting-point to-day. You shall begin by telling me some of the properties of fish which make it useful and *nutritive as food.*"

After thinking for a few minutes, Norah said, "I remember I was very much surprised at first to learn that the flesh of fish is composed of exactly the same materials—fibrin, albumen, and gelatine—as make up beef and mutton, and all other kinds of meat. Fish and flesh do not look very much alike, and yet the chief difference between them is that fish is more watery, and contains less of those substances in proportion to its weight than is found in butcher's meat. That is the reason why it is not so nourishing and sustaining."

"But in spite of that it makes excellent food," said Mary Jones, "because it is so very easily digested."

"Then, too, it is so cheap that it comes easily within reach of all classes of people," added Norah.

"Very good indeed, girls," said Miss Brown. "I am glad to find you have not forgotten your old lessons. Yes," she added, "fish certainly is a very valuable article of food. Indeed, it deserves to be much more widely used than it is in all homes, and especially in the homes of the poor, because of its cheapness."

"But while speaking of the cheapness of fish as compared with other food, I must warn you that quality as well as price must be taken into account before we can say whether a thing is cheap or not. Never buy fish simply because it is offered at a low price, for in no article of food is the inexperienced purchaser so likely to be deceived as in this one."

"Indeed, the choosing and purchasing of fish demand more knowledge and more care on the part of the purchaser than she requires in perhaps all the rest of her marketing."

"In the first place, it must be clearly understood that certain kinds of fish are in their prime condition,

and therefore fit to eat, only during certain parts of the year. We then say they are in season. At other times they are not in a healthy state, and, as a matter of course, they are then very unwholesome as food; in fact, they are likely to make people ill who eat them."

"I remember you once told us something like this about the salmon," said Norah. "When these fish start on their return journey to the sea, after laying their eggs in the head waters of the river, they are very thin and poor and wretched, so that some of them die even before they can get back to the salt water. I suppose at that time they would be unfit for food. I heard father say a day or two ago that salmon was out of season now."

"Yes, Norah, that is so," said Miss Brown, "and you may take it as a general rule that, for some time after the spawning, all fish would be much better in the sea than in our fishmongers' shops. In other words, only such fish as are in season should ever be allowed in our markets as food for the community."

"There is always a striking difference in fish which is in season, and that which is not. A cod-fish, for example, in season is firm and solid, and has a white, opaque appearance after it is boiled; and when the flakes of flesh are separated, a peculiar, white, curdy matter is seen between them."

"When not in season, it has a very different appearance. The flesh is soft and flabby and very watery when cooked; it has a glassy, transparent look, too, with none of that curdy matter between the flakes. It is not in proper condition for food; it is out of season."

"Remember, what is true of salmon and cod is *equally true of all other fish*," she added; "and yet,

such is the beneficence and bounty of Nature's provision, that if every kind were taken only in its prime, there need be no dearth of fish throughout the year, for each one has its own particular spawning time, and therefore its own particular season.

"For us, under existing circumstances, it will be sufficient to know that it is wisest not to buy fish of any sort out of its proper season, however low the price at which it is offered.

"Oysters are a constant source of danger owing to carelessness in this respect. They are unfit for food from May to August, or, to put it in a more familiar way, they are in season only when the name of the month contains an 'r.' If, in spite of this, people will eat oysters during the other four months of the year, there is small cause for surprise when they have to suffer for it.

"Now, in conclusion," she added, "let me give you a few hints as to choosing fish. Perhaps the first points to be noticed are the eyes and gills, for if the fish is fresh, the eyes will be bright and glassy, and the gills very red and full of blood. Never be persuaded to take a fish, if the eyes are dull and nearly closed, and the gills have a pale washed-out appearance."

"I frequently go out shopping with mother," said Norah, "and I notice she always picks out fish that are short and plump in preference to larger ones that are long and thin."

"That is a very good rule, Norah, and one which will apply to all fish," said Miss Brown. "The plumper the fish is, the healthier and more solid its flesh is likely to be. And now, after what I have already said, I need scarcely remind you that the flesh should always

be firm to the touch. Soft, flabby, watery-looking fish must always be avoided; it is not good.

"Neither should there be the least suspicion of an unpleasant smell; the smell of good wholesome fish should always remind one of the sea, but nothing smells so horrible as bad fish.

"There is an unmistakable appearance, too, about the scales of a fresh fish, which should always be bright and glistening, never dull-looking.

"In a plaice the red spots on the back are the best test of its freshness—the brighter the spots the fresher the fish.

"Soles require to be skinned before they are ready for the cook. They skin readily enough when they are fresh, but it is a difficult matter to remove the skin from a stale fish. Never buy a sole unless you see it skinned yourself; you then know it is fresh.

"The greatest care is needed in buying crabs and lobsters. Never take a crab without seeing it opened; if it is watery, be sure it is not good, and reject it.

"Hen lobsters are the best, and may be easily known by their broad tails and the feathery paddles beneath, crowded with the eggs or spawn. The best part of the hen lobster is the bright red coral, which is considered a great dainty."

*Summary.*—Never buy fish out of season; it is not good. When cooked it is certain to be soft, flabby, and watery. The eyes and gills are the best test of the freshness of a fish. These should be bright and red, and the flesh itself should be firm and plump to the touch.

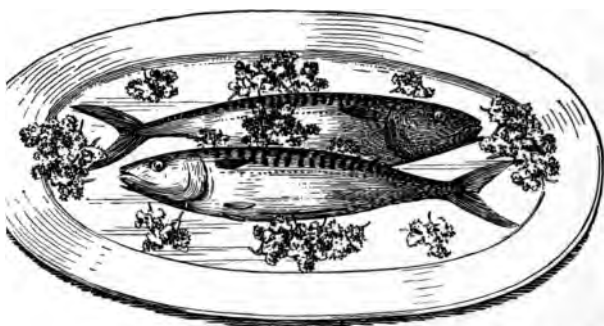
## PREPARING AND COOKING FISH

"We are now in a position to consider in a general way the treatment which fish requires at the hands of

to cook to prepare it for the table," said Miss Brown. Let us begin with the work of gutting and cleaning.

"In the usual way, of course, fish is gutted by the hmonger before it leaves his shop. But those who are fortunate enough to live by the sea, where they get their fish direct from the fishermen, have to know how to do this for themselves.

"Under any circumstances, it will be best for you



MACKEREL PREPARED FOR COOKING.

know how this ought to be done, in case you should ever be called upon to do it.

"Here is a mackerel; it will suit our purpose as well as any other fish. You shall watch and see how to prepare it.

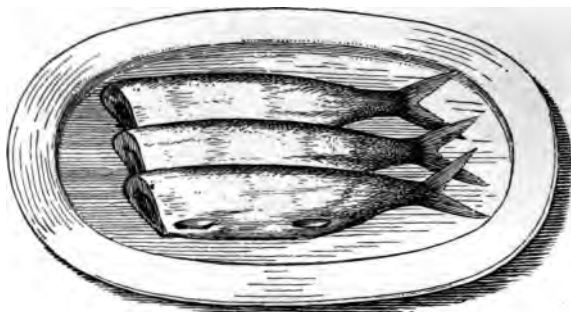
"I take the fish in my left hand, holding its silvery under side uppermost, and with a sharp-pointed knife cut it open about three inches down the middle. Then, with a slight pull at the gills, I can easily remove the bones and all the internal parts at the same time."

Her hands were busy as well as her tongue, so that by the time she had finished speaking, the fish was lying on the board, properly gutted.

"Some cooks," she added, "merely pull out the gills and gut, without cutting the fish open. Let me now show you why I prefer to open it in this way."

She took the fish in her hand, opened the slit as wide as she could, and called the attention of the girls to the dark, clotted blood inside.

"It frequently happens," she said, "that in dragging out the internal parts of the fish, the gall-bladder of the liver is broken, and the bitter fluid from it, if



HERRINGS PREPARED FOR COOKING.

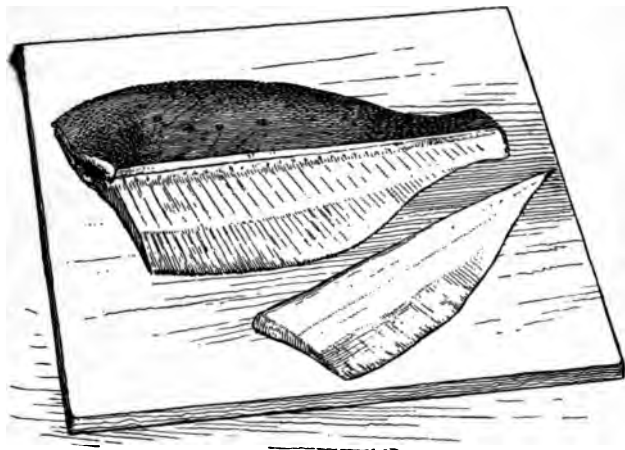
allowed to remain there, would give the fish a nauseous taste. Hence, whether my fish is gutted at the shop or not, I always cut it open and scrape and wash the inside well, to see that everything is removed, taking care of course while doing this not to break the roe."

Suiting the action to the word as before, she showed the class when she had done the inside of the fish, now perfectly clean; and nothing remained but to dry it carefully with a cloth to make it ready for cooking.

"This may serve as a general instruction for all fish," she continued, "except that with herrings it is usual to cut the head off, and remove head, gills, and

internal organs at the same time. In preparing a mackerel we do not remove the head. As I have a fresh herring here, you shall see how this is done.

"Now," she added, when the fish had been gutted, "if you compare the herring with the mackerel you will easily understand the reason for the next step. The mackerel, you see, is smooth, but the herring is



FILLETTED PLAICE.

covered with a profusion of scales. These scales must be removed, of course, before the herring can be cooked. This is the way it should be done."

She laid the fish on the board, and holding it by the tail proceeded to scrape it with a knife upwards toward the head, and at each movement the scales flew off on all sides, after which nothing remained but to wash it well, and dry it with a clean cloth.

"I have one other interesting process of preparation to show you," she continued, "before we leave



this part of our subject. Here is a plaice, which is meant for frying. This fish cooks much better if it is filleted, than it does if it is simply cut in slices. We will proceed to fillet it."

She laid the fish on the board with its brown side uppermost, and after first cutting off the head and fins, made a deep incision with a strong sharp-pointed knife along the back-bone. She then proceeded to cut it cross-wise in two places, after which she cut off the flesh in slices or fillets, leaving the bones bare. This done, she turned the fish over, and sliced off the flesh in fillets from the other side in the same way.

"Now, girls," she said, when the filleted plaice had been washed and laid aside in a clean cloth to dry, "we are next going to turn our attention to the methods of cooking fish. I want you to understand, however, that at this stage it will be enough for us to deal with the general principles involved; we have nothing to do at present with the preparation of particular dishes. That is to come later on.

"We cannot do better, I think, than commence with our fillets of plaice, which, as I have already told you, are to be fried."

While speaking she took down the pan, stood it over the fire, and proceeded to cut up some dripping into it.

"Now," she said, "while the dripping is melting, I will take the fish out of the cloth, and well dredge it with flour. Some people prefer to dip the fish in thick batter before frying it. That, however, is no *concern* of ours for the present; we shall discuss the *various methods* another time. All we have to do *now is to fry the fish.*"

By the time the fillets of fish were all ready the dripping was melted, and she pointed out that there was enough hot liquid fat in the pan now to well cover the fish, when it was put in.

"As we shall follow the general directions for frying, which I have already explained to you," she said, "I will now ask Norah to come to the front and show us how we are to proceed."

Norah at once went forward, and after watching the pan for a short time she put a piece of bread into the fat, which was now giving off a thin bluish vapour. When, after a minute or so, she took the bread out, it was quite crisp and of a golden brown colour, and she explained that the fat was ready now to receive the fish, which was accordingly put in.

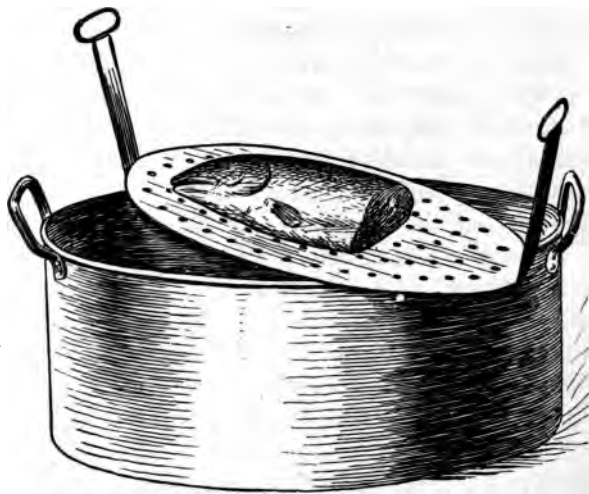
"Now, girls," said Miss Brown, "while the fish is cooking we can learn something. The plaice on the one hand, and the mackerel on the other, will, I am sure, be quite sufficient to call up in your minds two distinct classes of fish—the lean and the fat kinds.

"The lean fish, such as plaice, sole, turbot, haddock, whiting, and cod, are so deficient of fat that they cannot of themselves supply sufficient nourishment. One of the chief objects of the cooking is to add fat; and hence in frying them we let them swim in plenty of melted fat.

"When we boil them, we always make up for what is wanting in natural fat by adding butter sauces. The fish-pie, made of fish mixed with slices of fat pork, which is such a common dish among our fishing populations, is concocted on this very principle. Experience *has taught these simple fisher folk that the fat of the pork would supply what is deficient in the fish itself.*"

By this time the fish in the pan was done, and when it was taken out it was a light golden colour, and Miss Brown went on.

"In the oily kinds of fish," she said, "the large amount of fat, while it adds to their nourishing properties, renders them less easy of digestion. The



FISH KETTLE.

great object of the cooking in this case is to get rid of as much of the fat as possible. There will be quite sufficient left after the cooking to make this fish nourishing. Such fish are best adapted for grilling, boiling, or dry frying; and there is no need of butter sauces, as they are quite fat enough."

*Summary.*—The cleaning of fish requires to be done with care, or the gall-bladder is likely to get broken, and that would give the fish a nauseous taste.

## VEGETABLES AND FRUIT

"The butcher, the poulterer, and the fishmonger have all had their turn, one by one," said Miss Brown, and it is now time for us to pay a little attention to the greengrocer and the fruiterer. In other words, I may say it is my purpose this morning to deal with vegetables and fruit.

"Our first step will be to consider the nature of all vegetable matter, and after that I shall proceed to give you a few hints as to choosing and buying these important articles of food. Then in the next lesson I intend to deal with the preparation of the various vegetables for the table.

"It should be borne in mind that all our food comes directly or indirectly from the vegetable world, or it is clear that even the beef and mutton we eat derived their constituent parts from the vegetable matter on which the oxen and sheep fed. Nay, we might even go further than that, for the growing vegetable feeds on the inorganic matter of the mineral world, and with it builds up its substance. The animal cannot do this; it has no power to convert mineral matter directly into the flesh and bone of its own substance. The animal feeds by pulling down the new material which the vegetable has built, and uses this in its turn to build up its own body.

"Now let us pass on to the vegetables themselves, and see what we can learn of their structure. You remember, of course, that one of the chief constituents of all vegetable matter is starch. As this is a substance with which you are all familiar, I should like

you to tell me what you can of its nature and properties, before I go any further."

"Starch is always found in the form of tiny grains, which can only be seen with the help of the microscope," said Norah. "Those magnified starch grains in the picture made me think of tiny nuts, with the real starch shut up inside the hard wrinkled shell."

"That is a very clever thought of yours, Norah," said Miss Brown, "for those markings which are seen all over the starch grains are really due to the wrinkled nature of the case itself. You remember, no doubt, that the heat of the oven caused the starch grains of the rice and the potato to swell up and burst, and so set the starch itself free. If you could have seen these swollen grains just before they burst open, you would have found none of those wrinkled markings on them then."

"The starch would be useless as food shut up in those hard cases," said Mary Jones, "because it is insoluble, and therefore indigestible. The boiling water not only bursts the cells, but changes what is in them into a soft jelly, which is easily digested."

"Quite right, Mary," said Miss Brown, "and this shows us the reason why not only rice and potatoes, but starch foods of all kinds, require to be cooked."

"Now let us go a step further," she continued. "Plants have other constituents besides starch, but remember all of them are built up in the form of cells, with hard and more or less woody cases."

"The material of all these woody cases is a substance known as cellulose, and the cells of all kinds are held in their places by fibres of the same material."

"I need scarcely tell you that this woody fibre, or

cellulose, is very indigestible, and yet whenever we eat vegetable matter of any kind, we are compelled to eat a certain amount of it. Young vegetables, that is to say, those which have been grown quickly, are always better than older ones, because they contain less of this hard woody matter.

"The object of cooking is to soften and break up this woody fibre, and so set free the nutritive matter of the cells themselves.

"Raw meat, although we should not like the taste of it, would after all be easily digested, but raw vegetable matter, from the large amount of woody fibre it contains, is very indigestible. Cooking, therefore, is really far more necessary for vegetables than for animal food.

"It should be carefully borne in mind, however," she continued, "that these green vegetables are valued less for the amount of actual nutriment they contain, than for their stores of potash and other mineral salts, which act as a preventive against skin eruptions, and especially scurvy. In former times, when our sailors on their long voyages rarely saw anything in the way of green vegetables, scurvy was a terrible scourge; but since the potato has formed part of their daily rations, the disease has practically ceased to exist.

"Besides this, these green vegetables are of great service in the work of digestion, because the water which they contain helps to dissolve the nitrogenous matter of the meat, and, even in the stream of the circulation, dilutes the blood itself, by keeping these substances in a liquid state, so that it is enabled to flow freely, and perform its functions vigorously.

"Fruit contains even less nutriment, properly *sc*

called, than is found in vegetables; but it contains mineral salts, abundance of sugar, and peculiar acid properties, which make it agreeable to the palate, and also render it highly serviceable in the work of digestion, and in purifying the blood. Fruit, in some form, should occupy a place in every day's rations.

"Now for a few hints as to choosing vegetables," she went on. "This, of course, is a matter of very small moment to people in the country, who have nothing to do but to go out into their own garden and gather all they require; but to those who live in towns, a supply of good fresh vegetables must always be a source of some anxiety.

"You noticed, perhaps, that I said *fresh vegetables*. Well, vegetables of all kinds are best when they are quite fresh. You should never buy stale vegetables, or stale fruit either, although they may appear cheap."

"How are we to know stale vegetables from fresh ones?" asked Nellie.

"There is not much difficulty in that," replied Miss Brown. "Fresh vegetables, to say nothing of their unmistakable look of freshness, are always firm, crisp, and brittle to the touch; but when vegetables are stale, they become faded in appearance, and have a limp, wilted, flabby feel.

"Vegetables, after a time, begin to sprout. The very act of sprouting robs the vegetable of some of the best of its substance, which goes to feed and build up the young shoots.

"To sum up, then, never buy old vegetables, because the woody fibre in them makes them very *indigestible*; never buy wilted, limp-looking vegetables, *because they are stale*; and never buy those that are

sprouting, because the growing shoots grow by robbing the vegetable of its substance."

*Summary.*—Cooking is more necessary for vegetables than for animal food, because of the indigestible woody fibre it contains. Stale vegetables always get a limp, wilted, flabby appearance.

### CLEANSING AND COOKING VEGETABLES

"According to my promise, girls, I shall devote this lesson to the work of cleansing and cooking vegetables," said Miss Brown; "and we cannot do better than begin with the potato, for that certainly is more important than all the others. There is always hope for a girl who can cook a potato well, and I want all my girls to become adepts in this.

"One of the first essentials is to see that the potatoes are all as nearly as possible about one size, or the small ones will be cooked through, and begin to break up, while the larger ones are still hard and raw in the middle.

"Old potatoes are sometimes cooked *in their jackets*, and sometimes *without them*. If they are to be cooked *in their jackets*, I need hardly say it is very essential to have them thoroughly cleansed. This is done by washing and scrubbing them with a brush in cold water; but even if the jackets are to be removed, they should be well washed first.

"The paring is best done with a small, pointed knife; and, simple as the process seems, care is required, or there will be a great amount of waste. A careless girl will soon slice away the best part of the potato. Only a very thin paring should be re-



moved, and even in taking out the eyes, it is not necessary to dig out lumps of the potato itself."

Several of the girls pricked up their ears at this, and cast furtive glances one at another, for they had often heard almost the same words from their mothers.

"In places where immense quantities of potatoes have to be pared every day, potato-paring machines are used," Miss Brown continued; "but no thrifty housewife can afford to use them, for although they turn out the potatoes nicely pared and rounded, the waste would frighten her.

"New potatoes, after being well washed in cold water, are either scraped, or rubbed with a rough cloth to remove the skins. When the paring or scraping is done, the potatoes should be put into cold water, for this preserves their colour, but they must not be left to soak too long, or the starch from them will ooze out into the water."

"I suppose the most economical way is to cook them in their jackets," said Norah; "for our earlier lessons have taught us that the finest part of the potato lies just under the skin."

"Yes, Norah, you are quite right," replied Miss Brown; "although a great many people prefer to peel their potatoes before cooking them, and I must say a dish of white mealy potatoes looks very tempting.

"Now, as regards the cooking, I want you to remember a very important point. Old potatoes, whether in their jackets or without them, must be put into cold water. New potatoes, and indeed all *other fresh vegetables*, must be plunged at once into *boiling water*.

"The time required varies according to the size

and age of the potatoes, the older the potatoes the longer the time required. Potatoes properly cooked should have a dry mealy appearance when turned out of the sauce-pan—they ought to be '*balls of flour*.'

"It is important to bear in mind that the water in which potatoes are boiled is very unwholesome, because the potato itself contains a certain amount of injurious—I might almost say poisonous—matter, which oozes out during the boiling. It is for this reason that potatoes, which are intended for Irish stews and similar dishes, should be parboiled, and the water strained off, before they are put with the other ingredients.

"I had almost forgotten to say that for potatoes and all vegetables salt is necessary, but we must be careful not to use too much. A teaspoonful of salt to every quart of water will be found sufficient for all cases.

"Cabbages, 'greens,' and cauliflowers require very careful preparation, as they are likely to contain slugs or caterpillars; and these vermin could scarcely be regarded as appetising," she added, with a laugh, "if we found them on our plates at dinner.

"The coarse outer leaves must first be removed, and then the vegetables should be placed for about half an hour in a large pan of cold, salt water—allowing a dessert-spoonful of salt to every quart of the water. This steeping will draw the vermin out, and they must then be carefully searched for, and removed. Cabbages should be cut in quarters before they are placed in the salt water.

"As regards the cooking, all that is necessary is to *drain them well from the cold water, and plunge them into a sauce-pan of boiling water, with salt added,* &

for potatoes, and a piece of soda, about the size of a small nut, if the water is hard. They must then be left to boil very fast; and remember, the lid of the sauce-pan must be taken off the moment they come to the boil, and kept off till they are done.

"As they boil, they must be pushed down, and kept below the surface of the water, and the scum must be removed from time to time as it rises. A wooden spoon will serve for both these purposes."

"Oh, I remember I was once helping mother in the kitchen," said Norah, "and I thought she had made a mistake in leaving the lid of the sauce-pan off while the greens were boiling, so I put it on for her. But when she came back some time after, and saw what I had done, she lifted the lid off, and showed me that our 'greens' were not 'greens' at all, but 'browns.' I had spoiled them by keeping the lid on; I shall never forget it."

"Yes, child," replied Miss Brown, "that was a good lesson for you, although not a very pleasant one at the time, I am sure; but you will never forget that if we wish to preserve the green colour of vegetables, it is necessary to keep the sauce-pan uncovered."

"How can we tell when they are done?" asked Mary Jones.

"Oh, that is very simple," replied Miss Brown. "A fork will soon tell you when the stalk is tender; and as soon as that is the case, the vegetables must be turned out into a colander to drain. Cabbage and greens should be pressed with a plate to squeeze out the water, but of course we do not press cauliflowers."

"French beans and peas require as careful cooking as greens, if their colour is to be preserved. They,

too, must be put into boiling water direct, with a sufficient quantity of salt, and boiled rapidly in an uncovered sauce-pan. When done, they should be turned out into a colander to drain.

"The work of preparation in both cases is very simple, and is quite familiar to every girl. The peas have only to be shelled; the beans require stringing and slicing. That is to say, the strings from each side of the bean must be removed, and the bean itself cut into thin slices in a slanting direction.

"Carrots, turnips, and parsnips," she continued, "require very simple preparation. They are first well washed and scrubbed in cold water. The turnip and parsnip require to be peeled rather thickly—the turnip especially, as the outer part is bitter, stringy, and very indigestible. Carrots have simply to be scraped.

"Carrots and turnips, when intended for soups, are cut into small cubes, but when they are to be served as a vegetable, they are cut into three or four pieces. Turnips are usually cut into thick slices crosswise; carrots are divided lengthwise, by cutting them across the crown. In cooking, carrots take about an hour, turnips rather less."

*Summary.*—The water in which potatoes are boiled is unwholesome, because the potato contains injurious matter, which oozes out into the water during the boiling. Cabbages and greens must be boiled in an uncovered sauce-pan, or they will turn brown.

## PUDDINGS AND PIES

One morning during the school holidays Norah made her appearance in the kitchen at the usual time, with her clean white apron on, ready to assist her

mother in the preparation of the dinner. Day by day, as time went on, she took more pride than ever in the household work, and she began to look upon it as quite a natural thing, that whatever mother was doing, she must have her place by her side, and help. Needle-work, starching, ironing, cooking,—it mattered not what was going on,—she must have her place.

“What are we to have for dinner to-day, mother?” she asked, when she came in.

“Well, dear,” replied her mother, “I have settled upon a beef-steak and kidney pudding for to-day; but as father will be too busy to come home to dinner to-morrow, I am going to make him a small pie. He can take it with him to the warehouse, and it will be no trouble for him to pop it into the oven and warm it up when his dinner-time comes.

“Now suppose we commence with our pudding first,” she added. “I must get that into the sauce-pan as soon as I can, for a meat pudding requires good boiling. The first business will be to make the crust.”

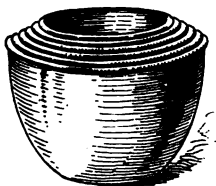
She put about a pound of flour into a large basin, and to this she added half a teaspoonful of salt, mixing the salt and flour well together with her hands.

“Now,” she said, “we must prepare the suet,” and she placed a piece of suet—about half a pound—on the chopping board, first of all taking care to remove all the skin from it. This done, she sprinkled the board with flour, and on a look of inquiry from Norah, she told her that this was done to prevent the suet from sticking to the knife while it was being chopped.

When the suet had been chopped very fine, she put *it into the flour, and then proceeded to rub it in lightly with the fingers, so as to thoroughly mix the two*

together. She next added sufficient cold water to mix it into a stiff paste, and lastly turned the paste out on the board, and proceeded to work it up with her hands, sprinkling it again with flour to prevent it from sticking. This done, she cut off a piece, and rolled it out with the rolling-pin.

"Now," she said, when the rolling was over, and she had a well-made piece of paste about half an inch thick before her, "we must next line the inside of the pudding-basin with the crust; but before I do this, it will be necessary to grease the basin itself to prevent the crust from sticking to it."



PUDDING-BASINS.

The greasing and lining accomplished, she went on to cut up the meat into small pieces, and put them in. Norah noticed that she was very particular with the kidney, and of course wanted to know why that was. Her mother pointed out the core in the middle of the kidney, and explained that this part has to be cut clean away—it is not wanted.

"I suppose, mother," said Norah, "the meat is cut up small, in order that it may be thoroughly cooked."

"Yes, dear, that is the reason," said her mother. "The meat would have less chance of getting well cooked if it were left in large pieces. Nothing remains to be done now," she added, "but to season with salt and pepper, add a little water to make the gravy, and then cover up the basin with the rest of the paste; and as she spoke she rolled out the paste, and spread it over the basin like a cap.

"Now for the pudding-cloth," she said, and she took

the cloth by the four corners and dipped the centre of it into boiling water. Then, after sprinkling the wet part with flour, she tied it over the basin, taking up the corners and fastening them over the top.

"Now we will lift the lid of the sauce-pan, dear, and see that the water is boiling," she added, "and if it is, our



pudding may go in and boil without stopping till dinner-time; that will give it a good three hours.

"We will next turn our attention to father's pie," she added, when the pudding had been popped into the sauce-pan, and they had returned to the table. "As in the case of our pudding, the main part of the business *will lie in the making of the crust*, but a pie-crust is a *totally different thing from a pudding-crust*. Let us set *about it at once.*"

She put about half a pound of flour into the basin, with a little salt, and then added a piece of dripping, rubbing the dripping well into the flour with the hands till it all disappeared.

Then she mixed it with water into a stiff paste, and after first working it up in the basin with her hands, turned it out on the board, which had been well floured,



and proceeded to roll it with the rolling-pin. As she went on, she called Norah's attention to the fact that she was rolling it in one direction only. She told her that if the paste were rolled backwards and forwards it would have a tendency to become dense and heavy.

*She rolled the paste out in this way till it was about one-third of an inch thick, and then she proceeded to*



spread more dripping in small pieces over it, after which she folded it up and rolled it out again.

This done, she spread more dripping over it in like manner, then folded it up and rolled it out once more, —and this she repeated for the third time.

“Now our paste is ready,” she said, “and it will make a light short crust for father’s pie. We will first grease the sides of the pie-dish, just as we did in making our pudding, and the rest will be easy.”

An old cup without a handle was placed in the middle of the dish, and the meat, cut up small, was laid neatly round it.

“There,” she said, “a little pepper and salt for seasoning, and a little water to make the gravy, and then we can cover it all up with the paste.”

She first wetted the top of the lining crust with water, and then laid the covering of paste over it, pressing both well together, and cutting off the edges with a sharp knife. All that remained after that was to make a hole with the finger in the middle of the pie, to allow the steam to escape, mark the edge round with a knife, and put it into a brisk oven to bake.

*Summary.*—The great point to remember about a meat pudding is that it must be well boiled. It should boil well for three hours without stopping.

THE END







